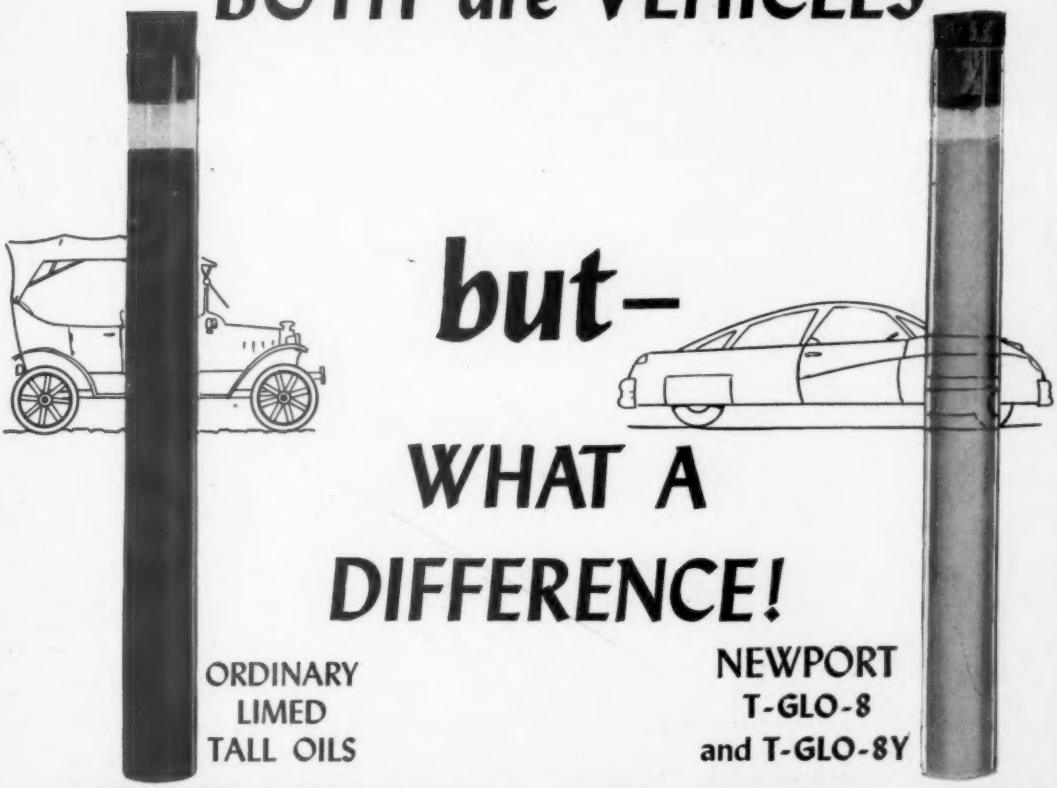
PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

SEPTEMBER

1951

BOTH are VEHICLES



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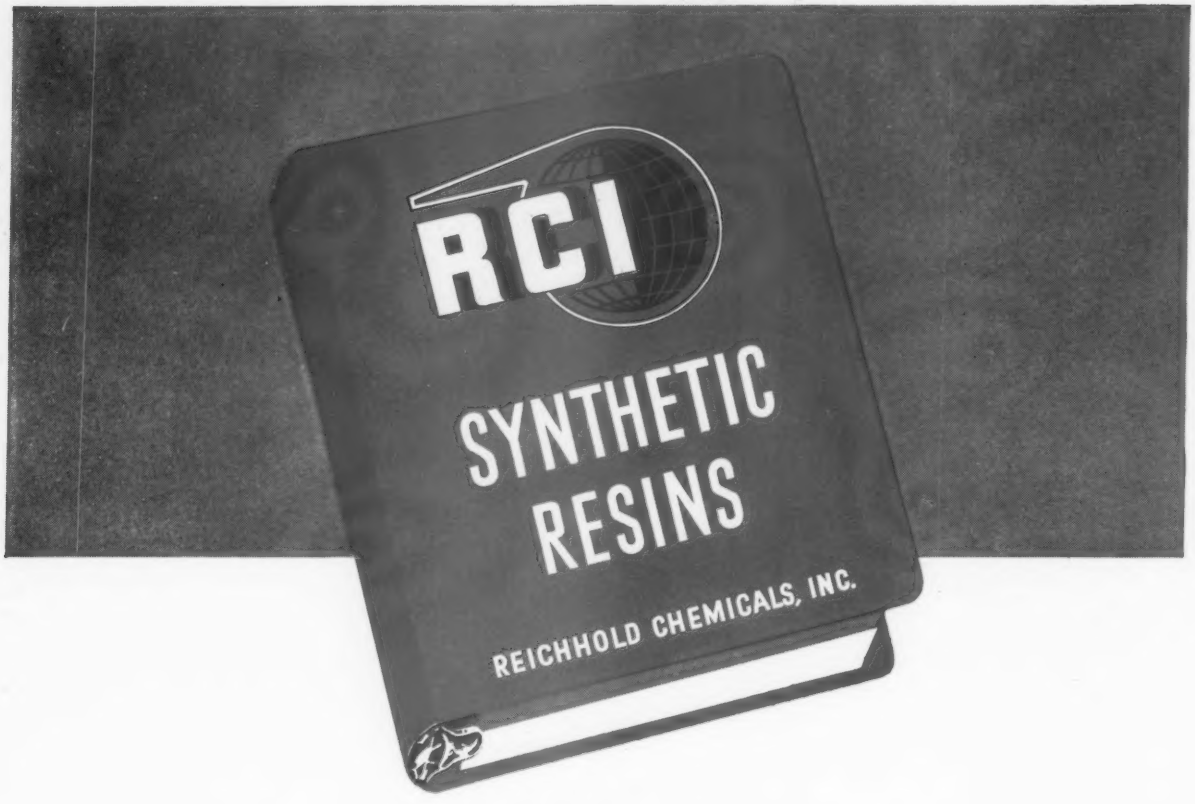

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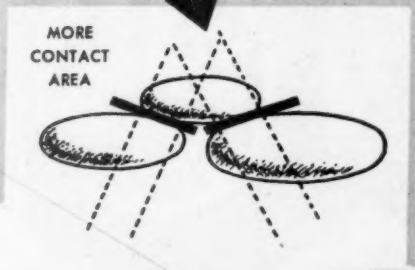

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PAINT and VARNISH Production

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint & Varnish Record)

VOL. 41 SEPTEMBER 1951 NO. 9

NEXT ISSUE

As you all know the Annual Paint Conventions and Paint Industries' Show will be held in Atlantic City at the end of next month. In this connection, we take pleasure in announcing that the October issue of PAINT and VARNISH PRODUCTION will be an all convention number. Programs of both the Federation of Paint and Varnish Production Clubs and National Paint, Varnish and Lacquer Association together with a listing of all exhibitors at the Paint Industries' Show will be included. As a special feature, we will present an interesting article on the paint technical developments in this country since the turn of the century. Be sure to see our October issue!

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Editorial Comment

About Our October Issue

IN connection with the forthcoming paint conventions to be held in Atlantic City, PAINT and VARNISH PRODUCTION takes special pride in announcing that the October issue will feature an interesting presentation of the technical developments of the paint industry in this country since the turn of the century. Emphasis will be placed on the fact that the industry in its early days was based on the art of paint compounding, religously passed from father to son with the absence and neglect of scientific background. This presentation will contrast many of the old practices and show how closely the art of the 1900's has been supported by the science of the 1950's. In other words, we will try to show that even though the paint manufacturer of yesteryear was ignorant of paint chemistry or paint making, in many respects he was quite correct in doing the things he did.

The paint and varnish industry at the turn of the century was just faintly beginning to feel the impact of organic chemistry on its classical formulation. High polymers were heard of and had an academic interest, but to most they were referred to only as "gunk."

The presentation will also show how with limited supplies of raw materials available and the absence of all types of synthetics, the old manufacturer could produce paints which even today are considered of a high quality.

It will also afford an opportunity to the younger men of our industry to study the old-timers' techniques and perhaps improve their own. Too often the younger men of today are apt to criticize and deprecate their predecessors rather than to study their methods and improve upon them. Perhaps the reason for this attitude is that the paint industry has grown so rapidly that we neglected to preserve the art of the past and as a result overlooked the possibilities of the many fine products of years ago. In this respect, be sure to read this presentation in the October issue. For some it will bring back memories; for others it will acquaint them with the past.

Navy Adopts New Policy on Bids

PAINT manufacturers who have their products tested by independent laboratories to meet Navy requirements may include the cost of such testing in their bids.

Under the old system of inspection by Naval Laboratories only, a manufacturer had to wait for Navy approval before he could submit a bid. Now, he may test the paint himself or obtain a certificate from an approved independent laboratory stating that the product conforms to Navy specifications. Samples may be still submitted to the Naval Laboratories, if one so desires.

This practice has been successfully employed by both the Maritime and General Services Administrations in the past.

New Drying Oil

RECENT experiments have revealed that the Rohini, an Indian forest tree, may be a source of a new drying oil. The tree is found in Bengal, Bombay, Orissa, and Utter Pradesh. Its seeds yield a fatty oil which dries four times as rapidly as tung.

The Forest Research Institute at Dehra Dun has been investigating the possibilities of the tree since 1940. However, expensive extraction in which benzene and ether were used have prohibited wide application in paints and varnishes.

The Institute now reports that an inexpensive method has been developed without utilizing the above solvents.

Paint and Missiles

SMOOTHER and lighter paints are needed for optimum performance of guided missiles. According to the Society of British Aircraft Constructors, the slightest bump on the body surface can effect the flight of a missile. It has been proved even a fly on the wing of a high-speed jet fighter can cause turbulence and stop the smooth "laminar flow" of air necessary for high speeds. Lightness is another requirement of such paints, and in addition they must be hard and durable enough to withstand high temperatures caused by the terrific friction of the air encountered with high speeds.

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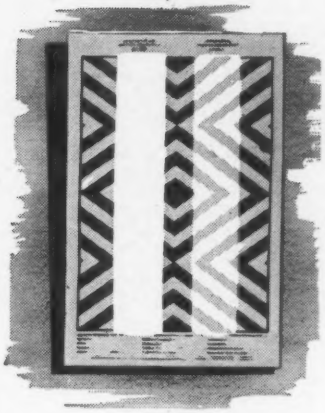

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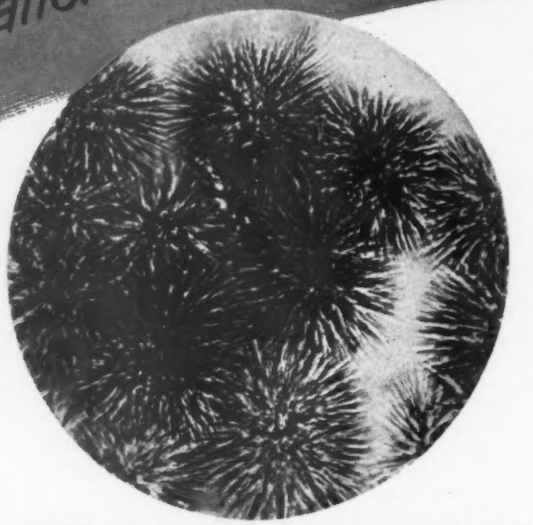

The secret of the superiority of "lead" paints lies largely in the typical and unique lead-soap crystals shown here. Notice interlacing of the spiney appendages. This adhesive, cohesive, felted mat structure is responsible for many of the superior mechanical and chemical properties that lengthen the life of "lead" paints.

The characteristics of white lead in paints are unequivocably and demonstrably true. For the reasons listed below, "lead" gives you numerous end-use advantages . . . such as controlled oil-penetration, improved drying and controlled chalking characteristics, greater mildew resistance, and protection against erosion . . . adding up to better appearance and longer *effective* service life.

"LEAD" LENGTHENS THE LIFE OF PAINT BECAUSE

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It Stabilizes—neutralizes acidic compounds resulting from the decomposition of the vehicle—prevents the film from becoming soft or liquefying.

It Plasticizes—forms lead soaps which increase film flexibility.

It Strengthens—flexible, spiney crystals in lead soaps mechanically reinforce the film and increase elastic strength.

It Resists Water—paint films with an optimum lead pigment content absorb only a small fraction as much water as they otherwise would.

It Limits Oil Penetration — more of the vehicle remains in the film where it is needed; less is absorbed in the substrata.

It Improves Appearance — by controlling chalking and inhibiting mildew.

The reasons for including white lead in the formulation of mixed pigment house paints make equally good sense to the paint chemist and to sales management. Simplified, they are understandable —and highly *saleable*—to anyone who makes, sells, or uses paints.

Lead Industries Association,
420 Lexington Avenue,
New York 17, N. Y.

Visit our booth No. 35 at the Sixteenth Annual Paint Industries' Show, October 31 through November 3, for the complete story of "lead" in better paint formulations.

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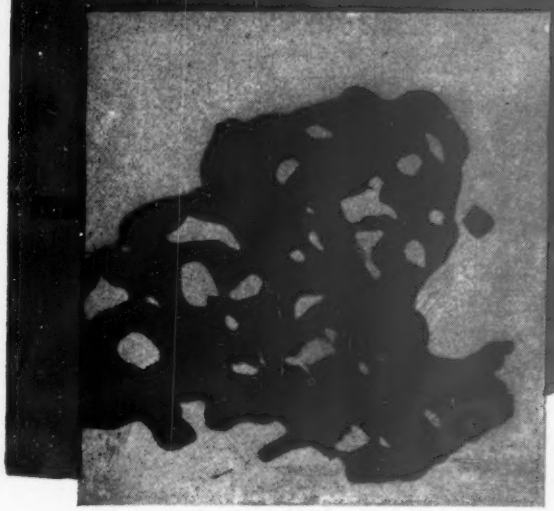

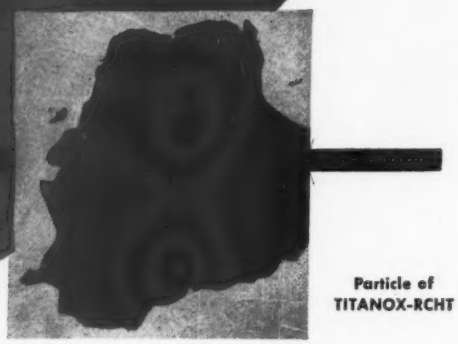

Particle of TITANOX-RCHT

Particle of TITANOX-RCHT from which calcium sulphate has been removed by solvent. Note how TiO_2 retains structure of coating over the extender.

COALESCED FOR UNIFORMITY

Only TITANOX Composite Pigments are coalesced. In this process, the titanium dioxide is precipitated upon the finely divided calcium sulphate. Thus the pigment and extender are durably bound together, as shown in the electron micrographs, in a uniform structure that positively resists stratification.

COALESCED FOR BRIGHTNESS AND HIDING

Co-precipitated TITANOX Composite Pigments embody the best method so far developed for extending rutile titanium dioxide to get the utmost in hiding power, retained whiteness and brightness. In one series of tests on flat wall paints, two samples of equal cost—one pigmented with TITANOX-RCHT and the other with rutile titanium dioxide plus extenders—were compared. The TITANOX-RCHT pigmented paint showed considerably more brightness and possessed half again as much hiding power as the paint employing the extended rutile pigment.

COALESCED FOR ECONOMY

With TITANOX Composite Pigments, seldom if ever is more than one type of extender needed to obtain desired effects. This is usually not true of the alternative pigmentation of rutile titanium dioxide plus extender because more than one type of extender is usually required to attain suitable paint and film properties. The cost of these extenders plus titanium dioxide is generally higher than that of the TITANOX Composite Pigment.

TITANOX Composite Pigments:

TITANOX-RCHT—general purpose...principal use—interior architectural finishes, white house paint.

TITANOX-RCHTX—specially processed (but not coated) to yield easier mixing and grinding when needed—same uses as RCHT but especially preferred for gloss finishes.

TITANOX-RC—"non-chalking"...principal uses—exterior tinted house paints, trim paints, porch and deck enamels, etc.

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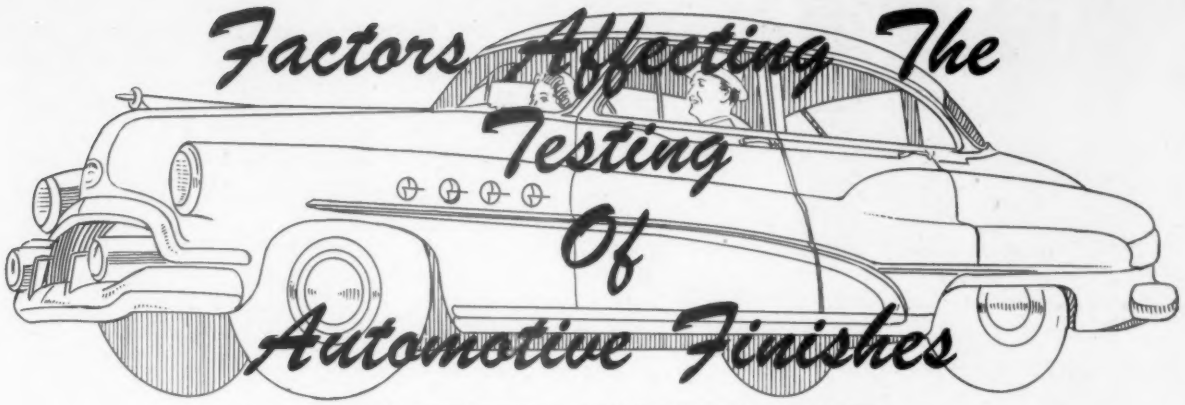
Factors Affecting The Testing Of Automotive Finishes



RALPH J. WIRSHING and WARDLEY D. McMASTER
General Chemistry Dept.
Research Laboratories Div.
General Motors Corp.

ONE'S ATTITUDE toward testing may well determine the type of test selected for emphasis. Generally, we do not care what a finish is made of, so long as it does the job. In other words, all of our testing is done to some rather informal performance specifications, and a standard sample is always included as a check on possible variables. In some cases we consider it desirable to determine differences between finishing materials so that our Standards Engineers may select the material giving the highest factor of safety. Thus, if finish A will last 10 years and finish B, 12 years, while the average life of the automobile is 10 years, either finish should be fully satisfactory, but finish B might be chosen for the factor of safety. We sometimes refer to the choice as being made on the basis of intrinsic worth rather than on mere acceptability.

Cleaning

THE building up of an automotive finish is as much a construction job as a skyscraper, and the foundation is equally important. The "bed-rock" may be steel, chromium plate, or a zinc base die casting, and cleaning is the first step. The "soil" on most automotive parts is usually a type of oil or grease with accumulated solids. If this be completely removed, there is obtained a practical basis for the finish, but if not, blistering and loss of adhesion develop.

The most familiar method of cleaning involves the use of combinations of alkaline media,[1] such as tri-sodium phosphate, sodium orthosilicate, sodium carbonate and sodium hydroxide, with soap or synthetic detergents in small amounts. Such cleaners are usually used in concentrations under 5 oz/gal., best results seemingly coming in the intermediate range.

Figure 1 shows panels prepared in the same system with different concentrations of alkali in the first cleaning stage. All were tested under a standard gilsonite enamel, by exposure to the General Motors 5% salt spray for two weeks. The superiority of a cleaner with an alkali equivalent of 7.5 cc. n/10 sodium hydroxide is indicated.

Failure to remove alkali residues completely is often costly in terms of subsequent processes. A temperature range 180–200° F. is normal for such baths.

Emulsion cleaners are a combination of alkali with a petroleum fraction and are presumed to furnish a type of solvent cleaning. The volatility of the petroleum fraction limits the temperature range to 140–160° F., and good rinsing is still important.

Cleaning with acid emulsions appears to be both economical and thorough, and may at the same time furnish a phosphate coating for the surface of the work.

Vapor degreasing is in more limited use and unless combined with an efficient spray wash, tends to leave solid matter on the surface.

Any of these cleaning processes may precede phosphatizing, more popularly known as Bonderizing, Granodizing, etc. One such process may be chosen to give any desired degree of added resistance to the finish system. It is in this field that there is considerable room for pitting intrinsic worth against acceptability, since, for the poorest phosphatizing procedure there is available a quality finishing procedure that may equal an average finish applied over a phosphate coating of greater intrinsic worth. We therefore consider it most important to determine the intrinsic worth by testing phosphate coatings in the salt spray under the most sensitive finishing system, which is a high bake gilsonite enamel.[2]

Figure 2 shows three panels. The first is relatively free from failure by loss of adhesion and rusting, but is necessarily baked so incompletely that it has little resistance to loss of lustre and surface deterioration. Increasing the bake to improve appearance on weathering also renders the system increasingly sensitive to loss of adhesion and rusting. The third panel demonstrates the use of the phosphate coating together with an optimum bake.

Plated Surfaces

ZINC and cadmium plating constitute a finish in themselves when applied to a steel surface. The salt spray test may be used to measure the quality of the zinc coating both as to continuity and thickness. In the case of cadmium, the salt spray is useful only to determine con-

This paper was presented at the fifth regional conference of the Protective Coatings Division, The Chemical Institute of Canada, Tornto, March 16, 1951.

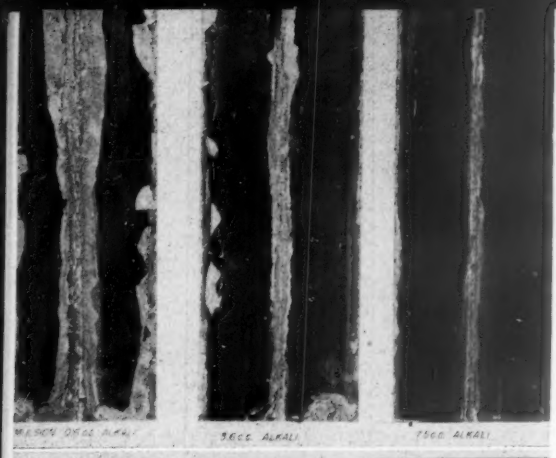


Fig. 1. Panels prepared in the same systems with different concentrations of alkali in the first cleaning stage. All were tested under a standard gilsonite enamel by exposure to the General Motors salt spray for 2 weeks. Superiority of cleaner with alkali equivalent, 7.5 cc 10th normal sodium hydroxide, is shown.

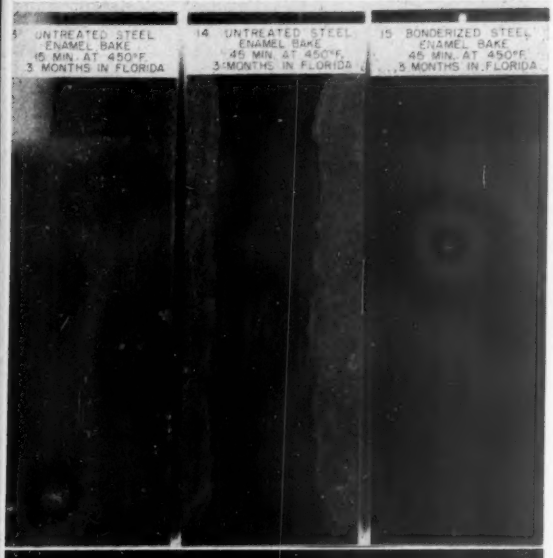

13 UNTREATED STEEL ENAMEL BAKE 15 MIN. AT 450°F. 3 MONTHS IN FLORIDA
14 UNTREATED STEEL ENAMEL BAKE 45 MIN. AT 450°F. 3 MONTHS IN FLORIDA
15 BONDERIZED STEEL ENAMEL BAKE 45 MIN. AT 450°F. 3 MONTHS IN FLORIDA

Fig. 2. Three panels shown. The first is relatively free from failure by loss of adhesion and rusting, but is baked so incompletely that it has little resistance to loss of lustre and surface deterioration. 2nd panel, increasing the bake improves appearance on weathering and also renders the system increasingly sensitive to loss of adhesion and rusting. 3rd panel demonstrates the use of the phosphate coating together with an optimum bake for best results.

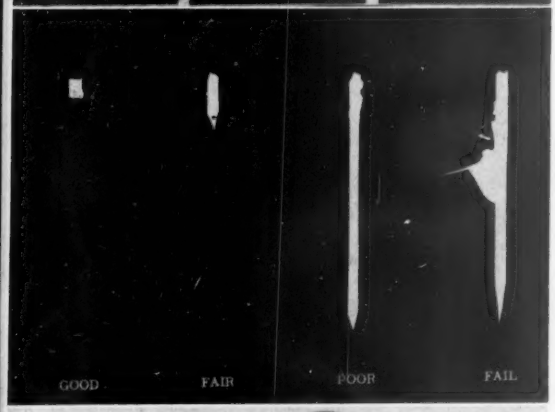


Fig. 3. Standards for rating adhesion to polished chrome plate. Cuts are made through film to metal, attempt made to lift film with knife.

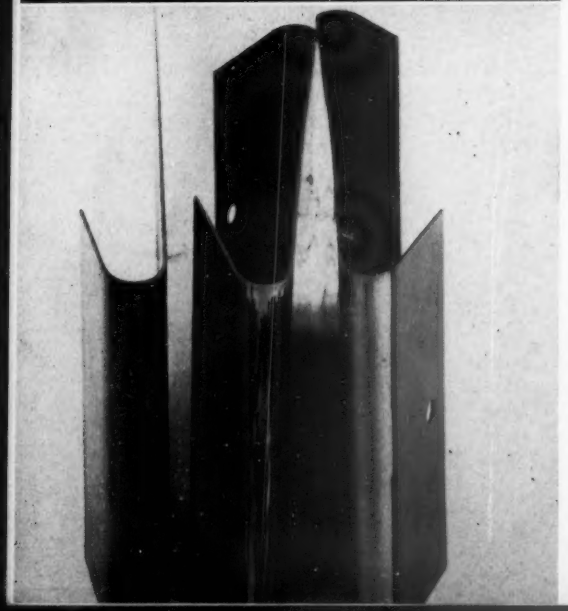


Fig. 4. Standards for rating adhesion to steel and flexibility by 0 F. Bend Test. Rating shown by the three panels are "good," "poor," "fail."

tinuity of coating. Decorative plating usually involves copper plus nickel plus chromium. Here again, salt spray offers a means of detecting a non-continuous coating, but is not a measure of the effective life of the plate. To date the only practical test consists of exposing parts on a roof during the colder 7 or 8 months of the year, with daily sprays of a 5% salt solution.

Results are obtained in one to four weeks. Plated zinc base die castings normally fail by excessive blistering, which may be obviated by the application of an adequate thickness of nickel. A properly plated part with 1.0 mil or more of plated metal will not blister on exposure for 24 hours in the acetic acid salt spray.[3] Copper will bleed through a nickel base having less than 0.2 mil of nickel, but specifications are usually high enough to prevent this.

Many chromium plated parts are now decorated with colored baking enamels and this practice has posed quite a problem in preparation. It is estimated that the enamel will not adhere well enough to permit outdoor exposure of 50% of the plated items as received. Exposure in a humidity chamber for 24 hours at 100° F. and 100% R. H. is sufficient to determine quality of adhesion.[4]

Adhesion

FIGURE 3 serves as a standard for rating adhesion to polished chrome plate. Parallel cuts are made through the film to the metal, and attempts made to lift the film with a knife. We feel that a rating better than "Fair" should be expected. In 40 to 45% of the remainder, it has been demonstrated that good adhesion is produced by a brief rinse in warm chromic acid.[5] Most of the remaining 5 to 10% may be "cured" by boiling in water or alkaline solution for 15 minutes, while the balance is incorrigible. It appears that the plated surface takes on some form of passivity which yields to the above treatments. No amount of polishing, alkali, or solvent cleaning will avail, and painted parts may be cold solvent stripped, painted and rebaked repeatedly without improving the adhesion. Control of the plating bath appears to be the key to this situation.[6]

Adhesion is also affected by the nature of the finish. Normally, a lacquer has poor adhesion to smooth

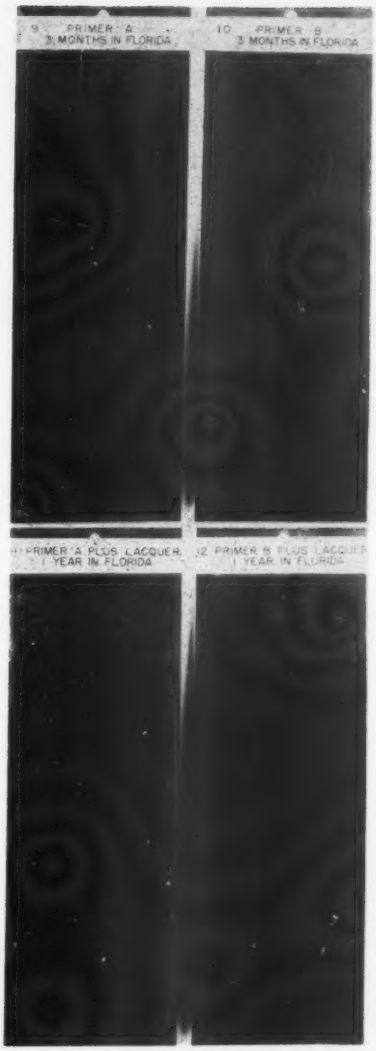


Fig. 5, Top: Panels coated with two different primers A and B respectively. Fig. 5A, Bottom: Same primers were used as in Fig. 5 except a lacquer has been applied, extending the life of system to one year with similar breakdown.

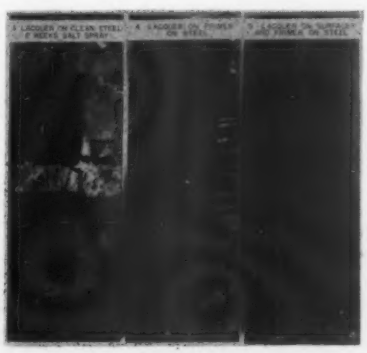


Fig. 6. Three panels illustrate the value of undercoats in promoting adhesion, durability.

metal, an air dried enamel, fair adhesion and a baked enamel, good adhesion.

Figure 4 shows standards for rating adhesion to steel, and flexibility by 0° F. Bend Test. Ratings shown are "Good," "Poor" and "Fail." A "Fair" rating is hard to illustrate but may be readily envisaged. The relative bake of different coats must be properly balanced or the materals may be misrepresented.

However, some enamels do not attain good adhesion by prolonged baking, but require 10 days minimum aging after the normal bake. Other enamels attain excellent adhesion with a bake of 1 hour at 200° F. but do not improve after several weeks of air drying without the bake. The present trend to include quantities of aluminum in the enamels for the sake of appearance is definitely detrimental to obtaining adhesion to chrome plate, and a primer must be used. A thin paint film will appear to have poor adhesion when exposed in humidity, and allowance must be made therefore. All of these factors must be borne in mind in interpreting test results.

A primer is a first coat designed to secure adhesion of subsequent coats to the base. It may have filling or sealing properties for application to porous surfaces and must be formulated with the nature of the succeeding coats in mind. Where the base metal is smooth, a smooth and glossy primer may be all that is required.[7] As has been pointed out under the subject of phosphatizing, primers of greatly varying quality may be compensated for by the subsequent coats.

Figure 5 shows two different primers, one badly rusted. In Figure 5A a lacquer has been applied, extending the life to one year, with a similar breakdown. The difference would be less pronounced had the usual surfacer been applied. Where the surface is rough, a much thinner coat of primer[8] may be followed by a heavy, relatively friable coat called sufacer, which is designed to be sanded smooth.

Figure 6 illustrates the value of undercoats in promoting adhesion and general durability. Normally, in spite of good sanding properties, a surfacer should not be porous enough to absorb the vehicle of the finish coats to the extent that loss of lustre results. The sanding of a glossy or thin primer may be the cause of the formation of objectionable blisters, due to reduction of film and increased penetration. The inclusion of phosphoric acid in a primer applied as a mist coat, will improve adhesion and weather resistance remarkably. The use of a similar coat of zinc chromate primer is advan-

Figs. 7 and 8. Two sets of panels show three film thicknesses of lacquer, one exposed in the humidity chamber and the other in the salt spray chamber. Note that thicker film has best moisture resistance and thinner film best resistance to alternate wetting with salt water & drying out.

tageous in securing the weather resistance of finishes applied to aluminum, or of finishes on steel subjected to excessive moisture.

Top Coats

IT is in connection with the top coats, however, that the most interesting factors are observed. The top coat is often, and quite properly, called the "finish," and performs the double function of imparting a suitable appearance, and of resisting the effects of exposure to the weather. The latter is accomplished mechanically by reason of gross thickness and this applies also to the undercoats. All are intended to protect the base from contact with moisture, but must be limited by reason of a tendency to inflexibility and consequent loss of adhesion, or cracking due to thermal changes. Films exceeding 4 mils are subject to thermal cracking and loss of adhesion. Figures 7 and 8 show three film thicknesses of lacquer, one exposed in the humidity chamber and one in the salt spray. Note that the thicker film has best moisture resistance, and the thinner film best resistance to alternate wetting with salt water, and drying out.

Thin films are subject to excessive moisture penetration, with resultant blistering due to osmotic pressures. The heavier films are more slowly penetrated and disperse the moisture through a greater volume.

All finishes exposed to the weather ultimately suffer deterioration through loss of lustre, and the surface deterioration of the film that exposes the pigment and produces the characteristic appearance known as chalking. Actually, loss of lustre is nearly always a measure of the degree of chalking. The pigmented film is so durable that its failure by microscopic cracking is long delayed. This failure proceeds inward from the surface, and is negligible either due to being microscopic or to the fact that cleaning wears down the surface as fast as it deteriorates.

Weeks Exposure Equivalent to 13 Weeks Starting May 1

Month	Weeks Equivalent	Month	Weeks Equivalent
January	17	July	13.5
February	15	August	14
March	13.5	September	16.5
April	13	October	18.5
May	13	November	21
June	13	December	19

TABLE I

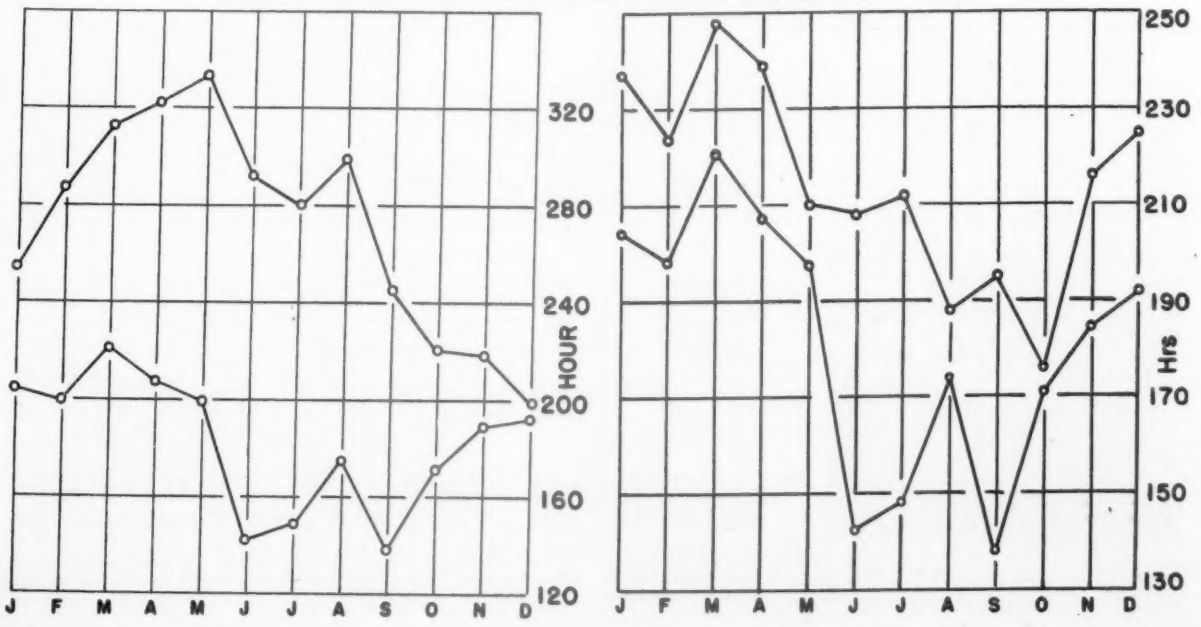
Exposure Conditions

TABLE I illustrates our first effort to take account of varying exposure conditions, and it is still in use. The values were determined by the average results obtained on panels exposed for three or more months, starting one month apart. They were left on exposure until appearance and loss of lustre matched a standard exposed 13 weeks from May 1.

Three to six months of Florida exposure are required for testing a finish. This lapse of time seems excessive and has led to the development of various so-called weatherometers. There are several interesting features that such instruments have in common.

1. They give their information in 20 to 60 days instead of 60 to 90.
2. The developments in these machines do not look like the developments of the same materials on outdoor exposure.
3. There is no known relationship between the two types of exposure for most items.
4. A number of clear varnishes and lacquers have shown a numerical relationship between instrument and Florida exposures.
5. Fading and chalking tendencies may be compared on

Fig. 9. Left chart shows total hrs. of sun recorded in 1947 and 1950; right in 1945 and 1947.



them in many cases.

Chalking tendencies may be greatly accelerated in Florida exposures by the use of the "cold box," which functions by promoting the formation of condensation on the surface of panels. General testing is still at the mercy of the weather, which is more variable, even in Florida, than most of us realize. Sunshine, rainfall, wetness, relative humidity, dew, and temperature changes all differ from season to season and year to year. Our test field is located 4 miles from the Atlantic, yet still in the area where the prevailing winds are from the southeast. Racks are facing due south with the exposure surface at 45° from the vertical. This is a standard angle, and quite satisfactory, though a greater angle would have given a theoretically more average position.

Figure 9 shows the total hours of sun recorded in the years 1947 and 1950. From this you can see that in 1950 we clocked over 2500 hours while in 1947 not quite 2200 hours were recorded. That is a difference of over 400 hours. If we were to average 10 hours of sun per day that would mean that we had 40 more days of sun in '50 than we did in '47. If sunshine is the cause of failure you can see that we might draw quite erroneous conclusions if we took the results in one of these years as typical of what might happen to the finish we were testing.

Figure 10 shows the difference in rainfall in the years 1944 and 1947. In all fairness we must say that these are the two extreme years we have noted since our records have been kept. But here again, if rainfall is contributing toward finish failures, then results obtained in 1947 would have been much more severe than those obtained in 1944 on the same material.

Early in our investigation we realized that the number of inches of rain that fell was not exactly the information that we needed. For example, if an inch of rain fell in one hour, the panels might be wet only a little over that one hour. However, if there was a continuous light rain for twelve hours, which totalled only one inch, the panels would then be wet for more than twelve hours with the same amount of rainfall that wet the panels for only one hour in the previous case. We therefore installed instrumentation that measures the number of hours the panels are wet. Here again we show the wide variation that can exist in two different years. From Figure 11 you can see that in 1943 panels were wet more than twice as many hours as they were in 1945. If this is the cause of failure how would you reconcile the differences you would observe on your test panels if you were not aware of the figures shown on this chart?

But perhaps moisture in some other form might contribute to these failures. We have been measuring the relative humidity and Figure 12 shows how widely this can vary in two different years. Here again we must point out that these are the two extremes recorded. However, we have conditions which gave us an average relative humidity of 69% during 1947 and only 51% during 1941. If relative humidity has a bearing on failures then quite different results should have been obtained in these two years, on the same sample of paint.

Before we go on to some actual exposure tests we would like to show you some variations that can exist in the same month in different years. Table II shows differences that were recorded during the month

Fig. 13. Panels illustrate approximate differences in appearance obtained in two exposures.

Fig. 10
Inches of rain per month showing wide variations that can exist in two different years

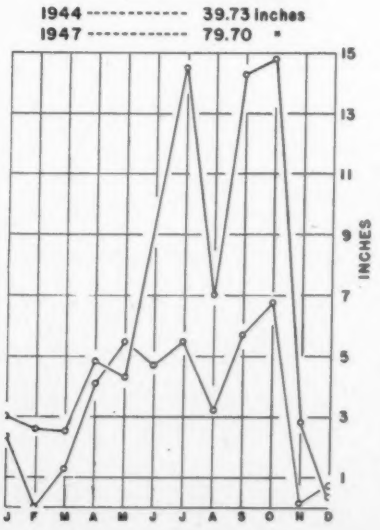


Fig. 11
Hours panels were wet with rain and dew showing wide variations that can exist in two different years

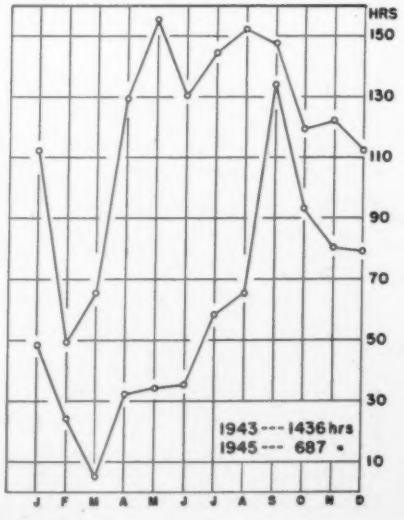
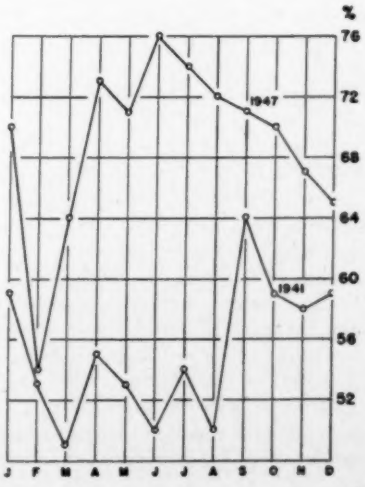


Fig. 12
Average Relative Humidity per month showing wide variations that can exist in two different years



Variations in August

	Hours Sun	Inches Rain	Hours Wet	BTU sq. ft.
1941	339	3.12	189	1157
1943	245	13.45	152	1205
1945	298	5.30	65	1323
1947	175	7.00	52	1081
1949	204	6.76	47	1367

TABLE II

of August in five different years.

We might call your attention to the fact that in 1943 we had more hours of sun (245) than we did in 1947 (when we had 175 hours) although we had almost twice as much rain in '43 as we did in '47. We might also point out that in 1941, when we had only a little over three inches of rain the panels were wet 189 hours whereas 1949 with twice as much rainfall they were wet only 47 hours. This illustrates a point made previously. The BTU per square foot is our measure of the intensity of the sunshine and here again you can see a wide variation. More about this factor will be mentioned later.

Dealing with the Variables

FROM the foregoing you can see that if all of these variables have to be taken into consideration and each one given its proper emphasis in the final results, the problem becomes an enormous one. How to juggle all of these figures to come up with a factor that would be some indication of the severity of the weather during the exposure period is something we would like to accomplish. But how could we do it? Should we multiply the hours of sunshine by the percent relative humidity and divide by the hours wet or did we have to take the square root of one of the variables before multiplying by one of the others. Seriously we have never been able to come up with a satisfactory answer.

First of all we tried to establish the relative importance of each of these variables. The first step was to formulate a lacquer and an enamel, both of which would chalk rather rapidly, so that our tests would not have to be continued over too long a period of time. By this we do not mean that they were freaks in any way. They were formulations which we used in production back about 1932. The finishes used on our cars today are much better in chalk resistance. Two of our suppliers cooperated, one furnishing the lacquer and the other, the enamel. We exposed identical panels in such a manner that one or more of the variables just discussed, was held practically the same for all panels in the group. The photograph, Fig. 13, illustrates the approximate difference in appearance obtained in the several exposures. The labels indicate the actual exposures given these sample panels, and may be of some interest. Table III shows the lustre ratings of these groups of panels at significant intervals during their exposure. They serve to illustrate the very considerable variations that are obtained by the unsuspecting researcher when adequate information is not available.

The idea still prevailed that it was sunshine that was the chief cause of failure, but we thought that perhaps our measurements of the number of hours of total sunshine was in error and that what we really needed was some measure of the intensity of the sun. Experience had shown that practically no failure would occur until the sun had reached an intensity of 3.04 BTU per square foot. This is known as the minimal perceptible erythema unit. It is an intensity high enough to cause sunburn. Due to the position of the panels while on test, in relation to the rising and setting sun, this intensity is usually not reached before 9 AM, and drops below it at 3 PM. Panels exposed only before 9 o'clock and after 3 o'clock show relatively little failure after long periods of exposure.

We therefore began a measurement of the sunshine in BTU per

(*Turn to page 32*)

Group	Panel	Finish	Identical Conditions	Lustre Ratings (Weeks) 1	2	4	7
A	9	Enamel	Different times	80	78	78	66
	81	Enamel	of the year, but	85	83	40	15
	39	Lacquer	checked at same	88	80	65	..
	47	Lacquer	intervals.	86	70	40	..
	55	Lacquer		83	65	20	..
	151	Lacquer		89	87	81	..
B	47	Lacquer	Same hours	86	70	40	..
	119	Lacquer	of sunshine	87	86	83	..
	139	Enamel		80	75	55	..
	147	Enamel		89	87	76	..
C	53	Lacquer	Different time of	95	73	32	0
	117	Lacquer	year, but same	92	90	85	78
	57	Enamel	hours wet.	77	75	73	70
	81	Enamel		85	83	40	15
D	5	Lacquer	Same time of dif-	90	87	65	10
	117	Lacquer	ferent years, wet-	92	90	85	78
			ness and sun the same				

Group A indicates that some differences at different times are significant.

Group B shows that equal hours of sunshine will not give the same results in appearance.

Group C shows that the same hours of wetness with other factors varying, will not give the same results.

Group D indicates that with sun and wetness the same, some factor, possibly the difference between dew and rain, may be causing different degrees of failure.

TABLE III

Color Effects In Electrographic Printing

By

DR. MAX KRONSTEIN
College of Engineering
New York University

SALT-FOG EXPOSURE OF COATED STEEL PRODUCTS PRODUCES INTERESTING COLORS

ELECTROGRAPHIC printing as a test method for organic coatings on metals has been described in a paper entitled Evaluation of Organic Coatings By Electrographic Printing.[1] It has since been utilized in the Paint Research Laboratories of New York University where several thousands of such tests have been made. These were mostly tests of coatings over bare and phosphate-treated steel as well as coal tar coatings over grit and sandblasted steel.

Basic Principle

THIS method is based upon the fact that an electrolyte is allowed to attack the surface of a painted metal under a given pressure for a given length of time. At the same time, a low voltage current is applied in such a manner as to carry, wherever possible, metal ions from the metal base through the paint into the pores of an overlapping paper, where these metal ions can be reacted as iron ions with a potassium ferriferrocyanide bath and thus form insoluble and blue colored salts in the pores of the paper.

This ion migration will occur at such points or areas where the electrolyte has been able to penetrate through the paint film to the metal surface area where soluble or ioniz-

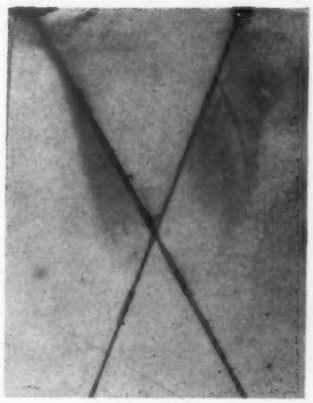


Fig. 1A

Fig. 1B

Fig. 1A. Coaltar enamel coating on gritblasted steel shows blue cross marks before saltfog exposure. Fig. 1B shows brown cross marks on blue-white color background after 96 hrs. of exposure.

Fig. 2A

Fig. 2B

Fig. 2A. Coaltar enamel coating on gritblasted steel shows a coloration of brown intermixed with blue after 248 hrs. of saltfog exposure. 2B after 416 hrs. Cross marks become white instead of blue.

This paper was presented before the Corrosion Conference of the Sea Horse Institute at Wrightsville Beach, North Carolina on May 24, 1951.

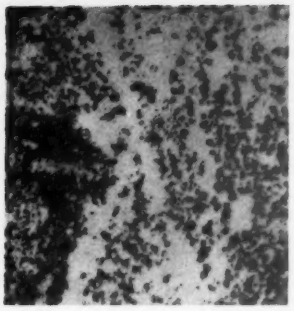


Fig. 3A. Coaltar enamel on gritblasted steel exposed 658 hrs. in saltfog chamber shows blue coloration. Note areas of non-ionizable rust.

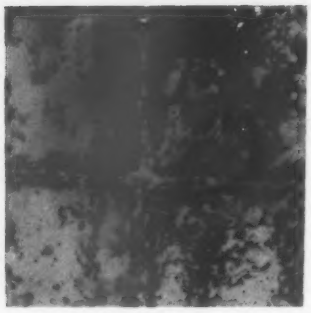


Fig. 3B. Submersible paint on gritblasted steel exposed in saltfog for 1000 hrs. White cross marks are clearly visible in colored background.

Fig. 4A. Commercial coaltar coating on gritblasted steel after 1060 hrs. of salt exposure.

Fig. 4B. OD paint on bare steel, 1000 hrs. exposure. Brown coloration due to corrosion.

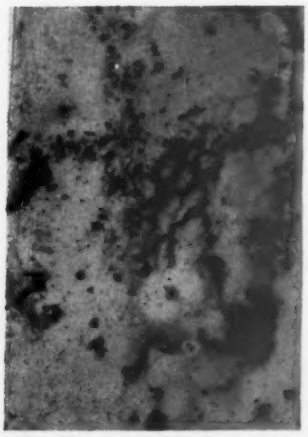


Fig. 5A

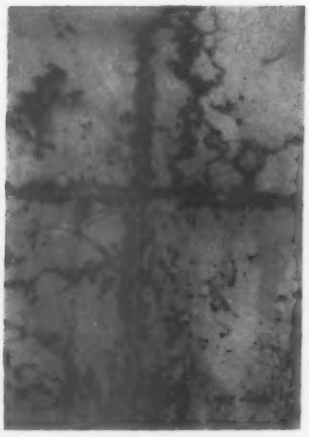


Fig. 5B

Fig. 5A. OD paint system on bare steel after 650 hrs. of saltfog exposure. Fig. 5B. Same paint on Bonderized steel. Phosphate treatment slowed down rate of deterioration of metal considerably.

able metal substance have occurred, and where such iron ions can migrate through the area affected by the electrolyte to the paper on the surface of the paint.

The evaluation of coatings with respect to their resistance to moisture or to the penetration of an electrolyte can be accelerated by exposing the coated panels in a standard salt-fog cabinet and printing the specimens after certain intervals of exposure.

Color Effects

AN interesting fact which this method has brought out is that with progressing exposure or with progressing corrosion, iron products are formed on the metal surface with different ionizability or solubility. These produce interesting color effects on electrographic prints which allows a new approach to the study of corrosion, plus the fact that permanent records of this study can be kept.

It is known that the ferric ion is insoluble in sea water of a pH of 3.0[2] or higher and it is possible to record this solubility by electrographic printing. How these developments become visible on the prints is shown in the accompanied figures.

Figure 1A shows the appearance of one of the electrographic prints of a coal-tar coated, grit-blasted steel panel with a test cross applied in the usual manner. This coating is used on submersible equipment. The cross lines serve, in this test series, as lines of decreased resistance to moisture penetration in the paint system. Therefore, these lines allow ion migration from the metal to the printing paper, which is shown by the usual blue colored print.

Figure 1B shows the same panel after 96 hours salt-fog exposure (10% salt-solution at 95° F.). The cross lines begin to widen as moisture spreads under the film. Because of the unsatisfactory paint thickness over the gritblast peaks, new color effects are produced around the peak areas, and the initial cross lines begin to show the formation of less ionizable iron derivatives, as indicated by the formation of greyish brown spots in the cross lines.

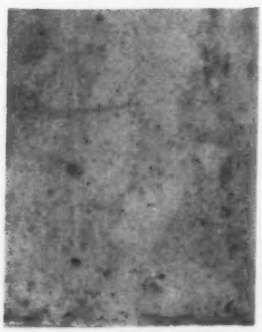
As the exposure of this particular panel proceeds, the new color area widens. This is shown in Figure 2A after 248 hours of exposure. Here thin blue lines are still present even in the initial cross line area. Some time later, after 616 hours, the initial

Top

Bottom

Fig. 6A

Top



Bottom

Fig. 6B

To illustrate reproducibility of results, 6A and 6B are 2 different panels coated with same paint system and exposed in same manner. Both were exposed 649 hrs. (top) and 770 hrs. (bottom) in salt fog chamber respectively. Parallel developments on both are evident.

cross line area has lost its own ionizibility completely and a white cross appears on the blue background of a now badly deteriorated coating system. See Figure 2B.

This phenomenon of progressing corrosion into the non-soluble or not ionizable state of rust is shown again in Figure 3A (after 658 hours of exposure) where large areas of the surface appear white with other parts showing intermediate color effects.

This coating is not representative of all paint systems. However increasing the film thickness would merely slow down the above developments, but the formations themselves seem to be quite general. Figure 3B shows, another submersible paint on a grit blasted base with a heavier film thickness after 1000 hours exposure. Again, the white cross is clearly visible in the colored background.

That all these various states of rust can be found side by side under progressing deterioration of the paint film is shown by another coal tar coating on grit blasted steel, Figure 4A, and on a bare steel panel, Figure 4B, with an olive drab enamel (Army 3–181; Fed. Spec. TT-E 485b) both after 1000 hours salt-fog exposure. Here some colored spots are caused by loss of adhesion of the paint, but the other color effects are due to various corrosion products.

Another example is shown in Figure 5, where the same OD paint had been applied on a bare steel panel Figure 5A, and on a commercial phosphated panel, Figure 5B. Here it is shown that the phosphate treatment slowed down the rate of the deterioration of the metal considerably, but in this instance the state of non-ionizable rust or the white cross line area had been reached after 600 hours salt-fog exposure.

To illustrate the reproducibility of these records, Figure 6A and 6B show two different panels with the same paint system (titanium dioxide/zinc oxide/silicate/alkyd vehicle) in the same states of exposure, that is, after

(*Turn to page 36*)

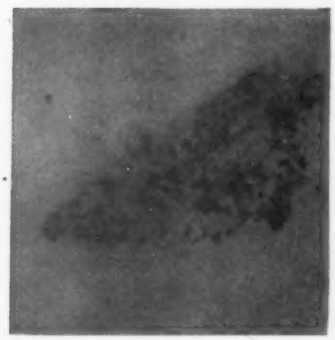


Fig. 7A

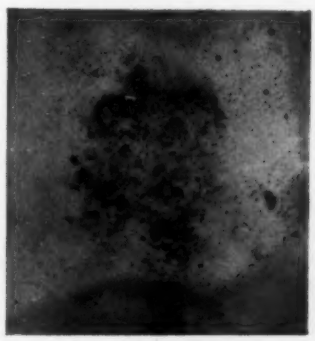


Fig. 7B

Electrographic prints on rust removed from test panel and "printed" on aluminum base. Fig. 7A shows a print of the rust as removed from panel. Fig. 7B shows a print of the same rust after the particles were pulverized. Note that some of the reactive substances were freed by this treatmnt.

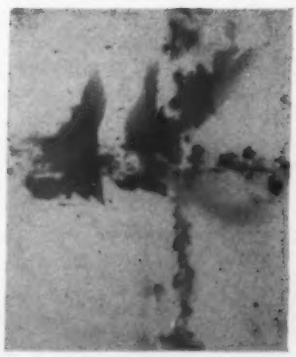


Fig. 8A

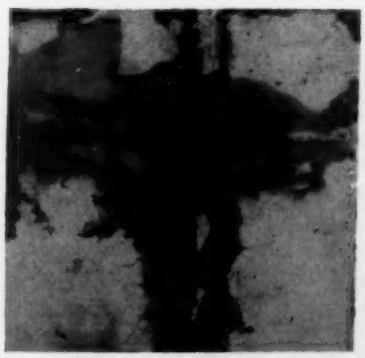


Fig. 8B

Fig. 8A is a specimen exposed 1500 hrs. in saltfog chamber. Note considerable non-ionizable rust present. Further exposure produced in saltfog produced new areas of corrosion. See Fig. 8B.

VINYLS

For Surface Coatings

Part IV

By

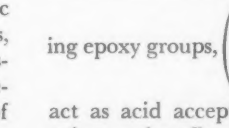
WALTER J. HANAU, Chemical Engineer

DUE to similarities in structure and chemical nature, the resins of this group share certain properties, which may be discussed for the group as a whole.

Solubility—While solubility behavior varies with the composition and molecular weight of the resin, we may say that ketones are the best solvents and aromatic hydrocarbons are frequently effective diluents. Esters, chlorinated and nitrated hydrocarbons, may occasionally be useful as solvents. These resins are generally very resistant to water, alcohols and aliphatic hydrocarbons which consequently act as precipitants when added to resin solutions.

Stabilization—Due to their chlorine content, the resins of this group show a tendency to split off hydrogen and chlorine from adjacent carbon atoms under the influence of heat, and to oxidize when subjected to heat or light, especially ultraviolet. These reactions tend to discolor and embrittle the vinyl coating unless the conditions which catalyze these deteriorating reactions are removed. It is advisable to discuss these factors briefly before discussing the specific means to counteract them. Thus, compounds of certain metals, especially of iron and zinc, greatly decrease heat stability. The use of chemically active pigments containing these elements should be avoided, and coatings to be applied over iron or zinc (galvanized) should be stabilized by any of the methods to be discussed below, if the coating is to be baked. Chemical stabilizers act to remove or neutralize substances or groups causing deterioration, such as oxygen and hydrochloric acid, which catalyzes further decomposition and unsaturation in the polymer molecule that is vulnerable to attack.

Stability depends greatly on the type, amount and purity of plasticizer used. This is further discussed in the subsequent section on plasticizers. Briefly, phosphate plasticizers show relatively poor stability, esters of organic acids (phthalates, etc.) are satisfactory, and polymeric alkyd plasticizers are even better.

Stabilizers—Organo-tin compounds are stated to function in the manner outlined above (i.e. as acid acceptor, anti-oxidant, and to eliminate double bonds by addition). Salts and oxides of HCl-displaceable metals are often used. Soaps of higher organic acids show better vinyl compatibility resulting in improved clarity and availability of stabilizing ingredients. Mixed salts and esters of polyphosphoric acid are recommended as light stabilizers. Some compounds containing epoxy groups,  which act as acid acceptors, are stated to enhance the effect of metallic stabilizers. Slightly basic, very water-insoluble pigments, such as lead pigments are stated to be the best heat stabilizers. The most effective of these, sublimed blue lead, metallic lead powder, and chrome orange, are too dark for light-colored coating formulations. For clear films, organic calcium and lead derivatives are effective heat stabilizers, but are sometimes objectionable due to their toxicity and decreased water resistance. For resistance to sunlight, inclusion of ultraviolet-absorptive materials are recommended in clear coatings, or those containing some of the more transparent pigments such as organic blue toners. Phenyl salicylate or lead phthalate may be used as a stabilizer. In pigmented exterior coatings, some of the more recently developed absorptive pigments such as lead titanate are very effective. Propylene oxide is recommended as a solution stabilizer to prevent discoloration of resin solutions kept in unlined steel containers.

Additives—In order to insulate vinyl chloride-acetate copolymer films applied over an active base metal, chiefly iron and zinc, against the catalytic action of the base metal toward thermal deterioration, a small amount of urea-formaldehyde or melamine-formaldehyde resin (1 to 3% based on vinyl resin content) may be added. Due to slight incompatibility, the amine resin separates out next to the active base metal, effectively insulating the copolymer film and preventing discoloration during baking. To prevent checking or other film discontinuity, a small amount of non-drying or long-oil

drying-type alkyd or non-drying or semi-drying oil is also added (1 part per 3 to 6 parts of amine resin). Certain phenolics and alkyds are stated to have an insulating action similar to that described for the amine resins, but these cause excessive color development or loss of film strength.

Primers

THE insulating function described in the preceding section may also be obtained by the use of an undercoat applied to the active metal. Oleoresinous varnishes or bodied oils are usually used. These are baked 15 to 30 minutes at 375 to 400° F with driers added if oil is slow drying type. The copolymer film is applied over this primer and baked at 350° F to gain adhesion to the primer. Normal butyl methacrylate polymer is compatible with a number of these primers, and its use in a primer, even as little as 10%, greatly improves adhesion of vinyl copolymer to the primer film, permitting much lower baking temperature (275 to 300° F) for adequate adhesion.

Chemical treatment of the metal surface provides another means of preventing thermal deterioration by catalytic action of the active base metal. Other benefits of these treatments include clean surface to be coated, inhibition of corrosion of the base metal, and roughening of the metal surface. This provides better anchorage and permits lower baking temperature. For these reasons, these treatments may be advantageous even when a "neutral" base metal is to be coated.

Active surfaces include chiefly zinc, iron, and tin plate. Most metals such as copper, nickel, aluminum, chromium, silver etc. show much less tendency to cause discoloration of copolymer coatings, and are designated as in glass.

Films of 0.0001 inch thickness or less may be baked even over iron without discoloration, because of the small amount of resin present. Where coatings of more than 0.0001 inch are to be applied and baking temperature exceeds 250° F over zinc or galvanized iron, 280° F for iron, steel or tin plate, or 325° F for "neutral" surfaces, the film must be stabilized by one of the methods discussed above.

Special Application Methods

SUCH methods aim at applying vinyl resin coatings of considerable thickness without the excessive solvent cost and drying time entailed by conventional solution coating.

Calendared Coatings—This method is used mainly for cloth coating. Fused resin-plasticizer-pigment composition is applied by hot rollers which entails expensive heavy-duty machinery.

Dispersion Resins—These resins were developed in recent years to retain the advantage of the above method without the need for expensive calendaring equipment. In addition, excellent toughness is obtained. These coatings are based on the principle of dispersing a high molecular weight resin in a liquid phase (plasticizer with or without diluent) in which the resin swells very slowly at room temperature, thus providing a workable pot life for several weeks. This dispersed state results in a workable consistency despite the high concentration and high intrinsic viscosity of the resin. Volatile components, if present, are released readily due to the discontinuous nature of the coating laid down. To convert the dispersion from a paste-like state to a strong, continuous film, it is heated ("fluxed") to a temperature at which the plasticizer is rapidly absorbed into the resin particles. This is fused into a homogenous mass. Fluxing temperature varies with the composition, usually about 325 to 350° F. Choice of plasticizer is important not only in determining coating properties and ease of fluxing, but also because of its influence on initial viscosity and on viscosity increase with aging which is due to swelling of resin particles. In general, appreciable false body may be expected due to the nature of the dispersion. This is aggravated by excessive pigmentation. If pigments are used, they should be of the low oil absorption type; to leave sufficient free liquid between the particles of resin and pigment, resulting in workable fluidity.

For thick coatings, especially if high plasticization is desired, formulations of 100% non-volatile content are feasible. These are called plastisols. For thinner coatings, or when insufficient plasticizer is present to give the required fluidity, some volatile diluent is added, usually hydrocarbon. This type of formulation is called organosol. A recent development, especially valuable for cloth and paper coating, where fire hazard cannot be tolerated, is the formulation of hydrosols, in which the resin, plasticizer, and other compounding ingredients are milled into water. In the preparation of all the above types of dispersions, ball milling is usually used to disperse agglomerates of resin particles.

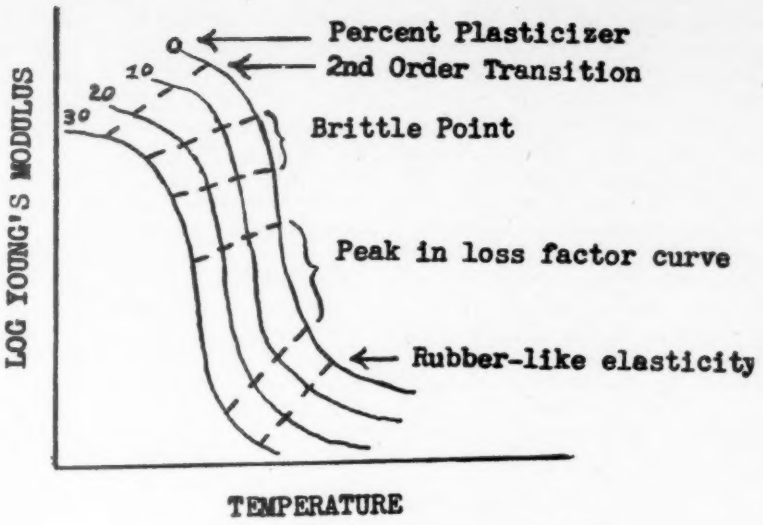


Figure 1. Effect of plasticizer with varying temperature.

Plasticizers

THE introduction of an external plasticizer serves to reduce or overcome the intermolecular forces of attraction of a polymer mass, thus increasing its mobility and essentially

bringing the mass closer to the liquid state. Softness, flexibility and extensibility are increased. Such properties as yield point, modulus of elasticity, and tensile strength decrease with increasing plasticizer content.

This type of plasticizer depends on a solvent effect to hold the plasticizer molecules and polymer molecules together. Most of the plasticizers in general use are esters, which because of their intermediate polarity, show compatibility with a wide variety of polymeric substances. Figure 1 shows a schematic diagram of the effect of plasticizer with varying temperature, as regards Young's modulus and transition points.

In passing, another type of plasticization should be mentioned. In the case of non-solvent plasticizers, the plasticized material consists essentially of plasticizer-rich droplets in a plasticizer-poor matrix. While this is frequently used in other polymeric materials such as nitrocellulose, no favorable reference has been found in the literature to its use with the materials within the scope of this paper. In some instances, mention has been made of the total inadvisability of this method with vinyl materials because of excessive spewing tendency (working of the plasticizer to the coating surface).

Structure and Performance

BESIDES the mutual solubility requirements, a commercially useful plasticizer usually must be resistant to evaporation loss, extraction by water and sometimes by oil. In many cases, it must also resist migration into polymers in contact with the plasiticized article.

Carboxylic ester groups are stated to be among the most effective solubilizing groups. At least two such groups are required per molecule, generally obtained by the use of dibasic acids, in order to obtain increased solubility and sufficiently high molecular weight to keep the volatility low. Phosphate ester groups are also effective solubilizers, while ether linkages or double bonds are of little value in this respect. The effect of alcohols used in producing the plasticizer can be summed up as follows: Aliphatic esters are superior to aromatic esters especially with regard to efficiency and low-temperature flexibility. Increase in alkyl chain length increases low-temperature flexibility, and decreases volatility, water extraction, migration, and efficiency (based on weight percentage). Aryl esters as a class give better resistance to plasticizer migration than alkyl esters, and phthalates are better than phosphates or sebacates in this respect. Usually, alcohols of more than 8 carbons produce incompatible esters. Generalizing, it appears that di-2-ethylhexyl phthalate is the best all-around plasticizer; tricresyl phosphate shows very low volatile loss and oil extraction, but poor heat stability and low-temperature flexibility; tri-2-ethylhexyl phthalate shows better low-temperature flexibility and slightly better heat stability than TCP, but higher volatile loss and oil extraction. To a large extent, use of TCP in conjunction with various other plasticizers shows the poor low-temperature flexibility and poor heat stability associated with TCP. Dibutyl phthalate shows too much volatile loss for most uses with vinyl resins, especially those requiring a bake. Various oxydibutyrates, thiodibutyrates, and tetrachlorophthalates are described as potentially valuable vinyl resin plasticizers.

Tabulated data, indicates that plasticizers of the acetylated ricinoleate type are highly effective and show fairly low volatility. Glycol sebacates show fairly high water extraction and high brittle temperature.

Besides dependence of cold flexibility on plasticizer structure, as discussed above, experiments have shown that poor low-temperature flexibility is produced by plasticizers which show high viscosity at room temperature. Good parallelism is shown between the temperatures at which various plasticizers show a viscosity of 1000 cp and brittle temperatures of vinyl stock using 35% of these plasticizers (brittle temperature arbitrarily determined). By the same token, it is found that most plasticizers which are solid at room temperature show only a limited temperature range of flexibility; thus camphor, triphenyl phosphate, hexaethylbenzene etc. lower the processing temperatures of polymers, but show low elongation at 10° C.

Polymeric Plasticizers

IN contrast with the softening action of the solvent plasticizers discussed above, polymeric plasticizers generally combine flexibilizing action with some degree of film-forming properties with consequent improvement of the film strength attained at any given degree of flexibility. Their main advantage, however, is their improved permanence (resistance to evaporation loss, oil and water extraction, and migration) which is due to the high molecular weight of these polymeric substances.

Elastomeric Plasticizers — Acrylonitrile rubbers as plasticizers in vinyl chloride-acetate copolymers produce excellent resistance to extraction by water and oil, swelling and volatile loss, as well as low brittle temperature and good low-temperature flexibility. 35 to 40% acrylonitrile rubber is recommended for best compatibility.

The usual way of blending acrylonitrile rubber into vinyl-type resins is stated to be breakdown of the rubber on a cold mill, plasticizing of resin on a hot mill, and milling these components together.

Alkyds—A series of plasticizers of this class show definite advantages for plasticizing vinyl polymers. High molecular weight unmodified polyesters are of lesser plasticizing efficiency compared to chemical "monomeric" plasticizers, but showing decidedly better light stability as well as decreased oil extraction and migration, negligible evaporation loss, as well as increased heat stability. The brittle temperature, however, is high compared to that obtained with the best monomeric plasticizers. Lower molecular weight members of the same class shows largely the same advantages except for higher oil extraction but these are still superior to chemical plasticizers.

Miscellaneous—Polyvinyl acetate is stated to be compatible with nitrocellulose, which is used as a softening agent. Polymers of vinyl ethers are reported to have been used in Europe as plasticizers for nitrocellulose, ethyl cellulose, polystyrene, and synthetic elastomers. Low molecular weight polymers of alpha-methyl styrene when used as partial replacement for DOP in polyvinyl chloride compositions show increased volatility, oil and water extraction, somewhat lower plasticizing efficiency, and improved heat stability. Compatibility data indicates compatibility or near-compatibility with most film-formers, except cellulose esters, at low plasticizer concentrations.

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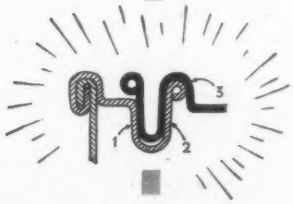

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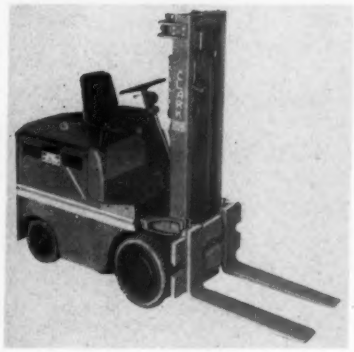

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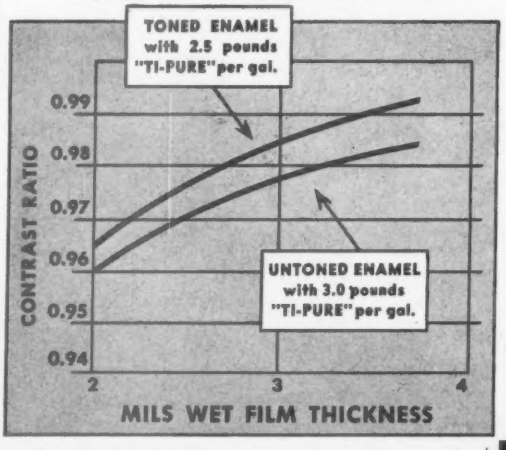
WESTON ELECTRIC

MOISTURE METER
All Purpose Type

Meter measures the moisture content of lumber, wood, plaster, and many other materials of varying textures. Known as the TAG Moisturonic Moisture Meter Model 8008, the portable instrument features an overall range of 2,000 ohms to 20,000 meg-ohms, which according to the manufacturer is a greater span than is available in other models. The instrument is available in two forms: one with a scale calibrated for use with lumber, wood, plaster and wood products and the other with linear graduations for use with materials for which no calibrations have been determined. Tagliabue Instruments Div., Weston Electric Instrument Corp., 614 Frelinghuysen Ave., Newark, N. J. PVP—Sept.

How to save up to ½ lb. of "Ti-Pure" RUTILE TITANIUM DIOXIDE per gallon of finish



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Magnetic stirrer is equipped with Teflon covered stirring magnets, which according to the manufacturer, will not break and are resistant to all acids and alkalis. The motor will stir one liter or more of liquids up to 60% glycerol solutions. Speed can be varied from barely turning to vigorous churning action and a separate on-off switch permits stirrer to be turned on or off without disturbing speed setting. Laboratory Industries Inc., 4710 W. North Ave., Chicago 39, Ill. PVP—September.

FILTER CLOTH

Acrylic Fiber

Dynel filter cloths made of acrylic staple fiber is said to be superior in performance to most filter materials. They have proven valuable as dyestuff and pigment filtration, particularly where hot acid is present. Other advantages include resistant to alkalies and most solvents, good dimensional stability and high wet and dry strength. According to the manufacturers, it possesses superior resistance to bacterial action, is mildewproof, easy to clean and nonblinding. Filtration Fabric Div., Filtration Engineers, Inc., Newark, N. J. PVP—September.

FLOW METER

Fast and Accurate Response

Flow meter gives fast and accurate response over an entire range and features low initial cost and maintenance according to the manufacturer.

It is reported that this flow meter includes such important advantages as an evenly graduated meter scale and electronic integration. It is available either as a mechanical flow meter with integral recorder, or as an electrical transmitter to be used with Brown inductance bridge receiver. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Roberts Ave., Philadelphia 44, Pa. PVP—September.

McLEOD GAUGE

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McLeod Gauge is suitable for the A.S.T.M. proposed test for reduced distillation of petroleum products.

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This new gauge has a wide range, from .1 mm to 20 mm linear, and .01 mm to 20 mm square. Emil Greiner Co., 20–26 N. Moore St., New York 13, N. Y. PVP—September.

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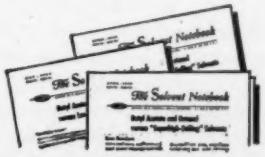

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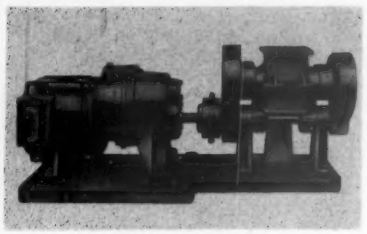

CHARLES ROSS

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This model, the #41 Steam Jacketed Heavy Duty One-Pint Kneader and Mixer, is the companion to a series of kneading machines ranging in size up to 150 gallons. The #41, in addition to one point, is also available in one-quart size.

Direct motor driven with a ½ Hp. motor, the #41 Kneader has a steam-jacketed trough which permits cooling or heating of the material and is built in two sections for easy dismantling for cleaning.

The stirrers are of the "sigma" type for a rapid mix with good shearing action and dispersion of materials, and are easily detached for cleaning. Charles Ross & Son Co., Brooklyn, N. Y. PVP—September.

PLASTICIZING Resin

Improves Adhesion

Compound combines the properties of a plasticizer and a resin. According to the manufacturer, Resinous Alcohol-8 will effectively plasticize nitrocellulose lacquers and at the same time improve their adhesive qualities. Test revealed that nitrocellulose lacquers containing the new compound, produced hard, flexible, water-resistant films. Films on mahogany plywood survived more than ten 60-minute cold check cycles of 120 degrees to a – 20 degree F.

Resinous Alcohol-8 is a light colored, viscous and non-crystallizing liquid. It is completely soluble in nitrocellulose solvents, and is compatible, not only with nitrocellulose, but also with many other natural and synthetic resins. Because it is relatively non-volatile and non-migratory, the company considers it a permanent plasticizing resin. Resinous Alcohol-8 is now in pilot plant production, and drum quantities are said to be available for evaluation and commercial use. General Mills Research Laboratories, Chemical Div., 400 Second Ave., Minneapolis, Minn. PVP—September.

ALKYD RESIN

For Hot Spray

Aroplaz 945-X-65 is recommended for the proper alkyd component of the hot spray lacquer as provided by the Military Specification MIL-L-11195(Ord). Lacquer, Lustreless, Hot Spray (For Ammunition). U. S. Industrial Chemicals, Inc., 60 E. 42nd St., New York 17, N. Y. PVP—September.

SURFACE ACTIVE AGENTS

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Series of water-soluble surface active agents known as Ultrawets belong to the group of organic compounds called alkyl aryl sulfonates. These products are further characterized as being anionic in nature because of the manner in which they ionize in solution as differentiated from other types of surface active agents. Ultrawet K is recommended in water emulsion paints because of its low salt content and where it functions as a wetting agent and emulsion adjunct. The Atlantic Refining Co., Chemical Product Div., 260 South Broad St., Philadelphia, Pa. PVP—September.

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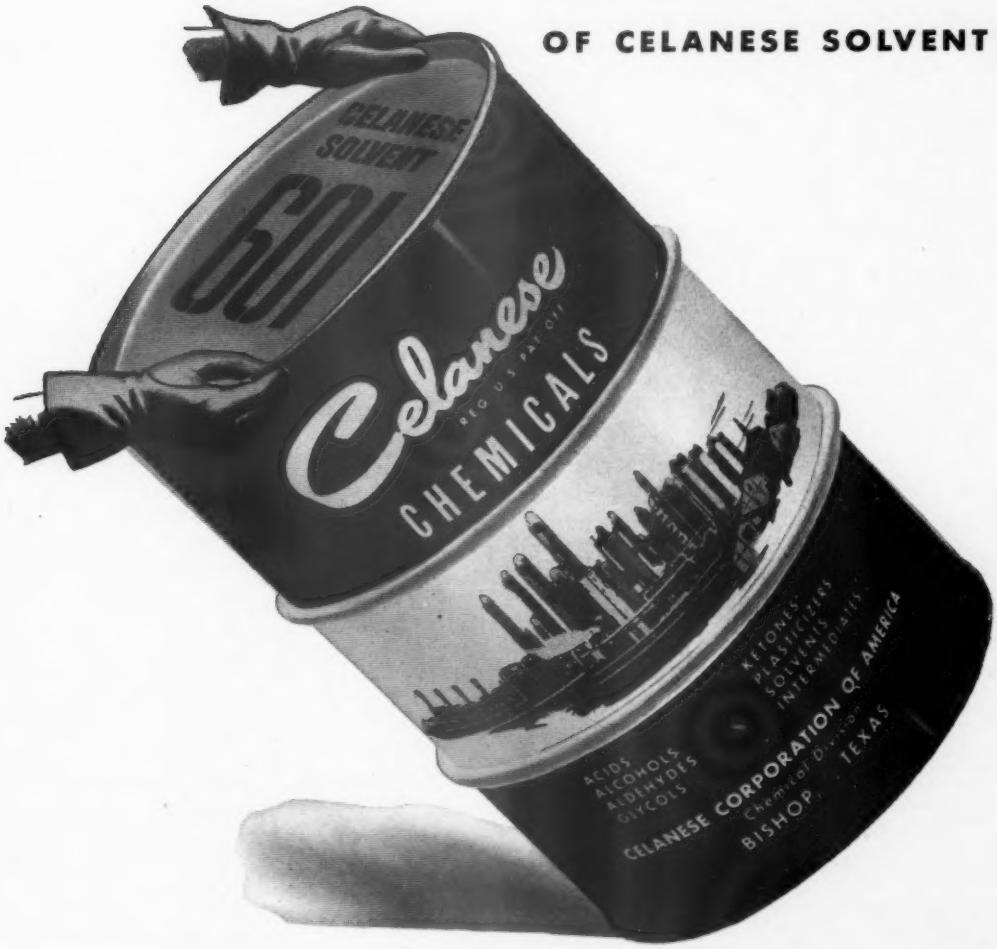

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AUTOMOTIVE FINISHES

(*From page 18*)

square foot, thinking that if we exposed for the same number of BTU's at any time, we should get similar results in the way of chalking and loss of lustre. Table IV tabulates results obtained using this new method of sun energy comparison. Group E indicates that there are other factors influencing the results in spite of the new approach. Group F shows that with total wetness the same, sun energy is still not the controlling factor. Group G brings in the variant of relative humidity, which appears also to play a significant part. Canadians will be particularly interested in Group H, a comparison between lacquer and enamel. This indicates better gloss retention of enamel, but shows that this trend may be upset by special conditions.

A number of years ago we published a paper in which we pointed out that lacquer lost lustre and chalked more rapidly when the sun shone on the panels while they were wet with dew, and have always maintained that moisture in some form was more detrimental than sunshine, though both moisture and light together, might be required. If you will refer again to Group F, Table IV, you will note the rapid loss of lustre of Panel 69. This panel was wet with dew over 20 hours each week of its exposure. On the other hand, panel 165 was not wet at all the first week and for less than 5 hours the second and third week. The fourth week had 32 hours of wetness, and this continued to the 7th week, producing a slightly accelerated loss of lustre. It is believed that wetness during the first week of exposure may be a controlling factor in later developments.

Since all of the tests we made continued to point to the important part played by moisture, in some form, we kept searching for a means of exposing panels with the moisture eliminated, or at least reduced to a minimum.

The *Smithsonian Institution* in Washington maintains a Bolometric Station high up on a mountain near Montezuma, Chile. Through the kindness of *Mr. L. B. Aldrich,* Director of their Astrophysical Observatory, arrangements were made to expose a few panels at this location. We know that it is extremely dry at this site which is at an elevation of 10,000 feet. As a matter of fact we were told that over one four-year period only a quarter of an inch of rain had fallen. The relative humidity was extremely low, at least during the time of our exposures, averaging between 15% and 20%. Since they also make sunshine measurements similar to the way we do at the Florida Test Field we had an ideal arrangement for making comparative exposures under wet and dry conditions.

The results, while startling, confirmed our idea of the important part moisture is playing in this type of failure. Chalking and loss of lustre were negligible, even after three months exposure. Panels were also exposed under window glass, quartz, yellow glass, and black glass, with no differences. However, when this test was repeated in Florida, typical heavy chalking developed on the regular panel, practically as much on the panel under quartz, 80% as much on the panel under window glass, very little under the yellow glass, and practically none under the black glass. This indicates that the damaging rays are definitely in the ultra-violet and blue spectra.

Our next effort was to eliminate all or practically all moisture effect by sealing panels in air tight cells, with controls in which we placed a small amount of water, also including filters. All of these cells were exposed in Florida, and results obtained that checked the two exposures in Chile and Florida, showing that location was not a factor; only the moisture difference.

We have felt that you would be interested in some of the factors affecting the testing of automotive finishes. Their presentation has involved mention of some of the fundamentals influencing automotive finishing, but the greater emphasis, which we believe timely, has been placed on the danger of drawing too definite conclusions from the casual exposures which have been the general practice of industry up to the present time. It is urged that any exposure tests of finishes include a material whose service durability has been definitely established by usage, so that it may serve as a standard of comparison for the untried materials as well as a check on previous or later exposure conditions.

Group	Panel	Finish	Identical Conditions	Lustre Ratings (Weeks) 1	2	4	7
E	55	Lacquer	Different times	83	65	20	..
	159	Lacquer	but same amount	90	88	86	..
	107	Enamel	of sun energy.	87	81	57	10
	131	Enamel		86	86	81	72
F	69	Lacquer	Exposed different	71	52	25	0
	165	Lacquer	years but sun and BTU less for panel 69 than for 165. Total wetness the same.	85	84	80	57
G	1	Lacquer	Exposed for same	80	65	36	7
	109	Lacquer	hours sun, same	95	90	80	30
	117	Lacquer	BTU, and different relative humidity: 73, 61, and 56 respectively.	90	88	85	77
H	69	Lacquer	5/7/49 to	70	53	25	0
	73	Enamel	6/24/49	85	76	70	30
	165	Lacquer	5/2/50 to	89	84	80	57
	169	Enamel	7/1/50	89	87	82	46

TABLE IV

References

1. Typical Spray Cleaner.
2. Gilsonite selects 48–52% by wt. Gum Rosin 4–6% by wt. Kettle bodied Linseed Oil 24–26, 46–50%. Iron Drier as metal, 0.14%.
3. 20% salt solution in soft water with <200 ppm solids plus 1% acetic acid; operated at 120° F.
4. 2 to 4 hours immersion in clear water at 100° F. is an alternate exposure.
5. Optimum temperature, 150° F. Concentration: 0.4 gm/gallon chromic acid/water. Blow off—do not rinse with water.
6. Make-up chemicals should be added in small amounts at frequent intervals for best results.
7. 0.5 to 0.7 mil.
8. Primer 0.3 mil; surfacer 0.9 mil.

W. H. BURNS

Velsicol Transfers W. H. Burns

Velsicol Corporation, Resin Sales Division, announced transfer of W. H. Burns from the Chicago sales office to the New York sales area. Burns, a chemical engineering graduate of Illinois Institute of Technology, joined Velsicol Corporation in 1948 as a laboratory assistant. For the past 1½ years he has been in Technical Sales in the Chicago office.

•

Reichhold Announces Expansion Program

As the first step in a new expansion program, Reichhold Chemcials, Inc., Detroit, announced the opening of executive offices in the International Building, Rockefeller Center, 630 Fifth Avenue, New York 20, N. Y.

Encouraged by impressions of international trade possibilities acquired on his recent trips to Europe and confirmed by Walter H. Bruer, vice president in Charge of European Operations, who has just completed a "world tour" of RCI properties, Mr. Reichhold is also launching a $10,000,000 expansion program, aimed at doubling the corporation's output of phenol and phthalic anhydride, two of its basic raw materials.

In addition, resin and color production facilities are being improved and enlarged at all Reichhold manufacturing plants which now number twenty-five.

N. Y. U. Offers Evaluation Course

The two-term graduate lecture course in Surface Technology, Chemical Engineering Course 174–175, given at the College of Engineering of New York University will be devoted to short-time evaluation techniques for surface coatings. The course will be under the direction of Dr. Max Kronstein. Lectures will be held at Washington Square beginning Sept. 26th. An accompanying laboratory course will be given at University Heights if justified by suitable registration. Contact Dean Henry J. Masson, Graduate Div., New York College of Engineering, New York 53, N. Y. before Sept. 17th for registration in this course.

American Cyanamid Announces Expansion Program

An expansion of facilities for the production of basic chemicals at plants in Niagara Falls and Welland, Ontario, was announced recently by A. O. Williams, Vice President of North American Cyanamid, Ltd. Accelerated defense and civilian demand both in the United States and Canada for chemicals derived from products produced at these plants was given as the reason for the expansion.

A further step in the expansion program will be the installation of equipment which will increase American Cyanamid Company's capacity for the production of melamine at Willow Island, West Virginia.

McCloskey's No. 10510
UNIVERSAL TINTING PASTE VEHICLE

The greatest money-saver and improvement for paint manufacturers since the discovery of titanium. Our technical staff have perfected an entirely new vehicle which is a must in every paint manufacturing plant, not only because it will save the paint manufacturer hours of labor and untold loss through waste such as skinning, hardening, etc., of tinting color, but reduces the tinting color of a manufacturer to one tinting vehicle for all types grinding mediums.

This marvelous vehicle eliminates the necessity of grinding tinting colors in different vehicles to meet the demand of each particular product. Frankly, you cannot afford to be without McCloskey's No. 10510.

Imagine . . .

ONE TINTING PASTE FOR –

STYRENATED ALKYDS
LONG OIL ALKYDS
MEDIUM OIL ALKYDS
SHORT OIL ALKYDS
HOUSE PAINTS
LACQUERS
OLEORESINOUS VARNISH ENAMELS
UREA RESINS
CHLORINATED RUBBER
MELAMINE RESINS

100% TINTING COMPATIBILITY WITH ALL OF THESE

Order a drum or a five-gallon container of this material at our risk.

McCLOSKEY VARNISH CO.
PHILADELPHIA • CHICAGO
PORTLAND, ORE. • LOS ANGELES

CHARLES G. STUPP

Barrett Names Charles Stupp Technical Dir.

The appointment of Charles G. Stupp as Technical Director of the Barrett Division, Allied Chemical and Dye Corporation, has recently been announced. He will be in charge of research and development as well as the technical control of products and processes for manufacturing. Mr. Stupp replaces Mr. S. P. Miller, who will continue with Barrett in an advisory capacity.

•

ASA Honors Carlton Rose

Carlton H. Rose, director of the Specifications Department, National Lead Company, Washington, D. C., has been awarded a certificate of service by the American Standards Association in recognition of his work in the development of American Standards. Mr. Rose is a member of the ASA Standards Council, representing the American Society for Testing Materials.

•

Upressit Names New Midwest Distributor

The Upressit Products Corporation, New York City, N. Y., has appointed the Ack Sales Company, P. O. Box 31, Kansas City, Missouri, distributor for the territory which includes Kansas, Iowa, Nebraska, Oklahoma, and Western Missouri. H. D. Ackerman of the Ack firm will be agent for Upressit's caps and tamperproof seals for cans, bottles, and other containers, its new No-Drip Nozzle, and an automatic capping machine distributed by Upressit.

Commercial Solvents Forms Chemical Market Group

Commercial Solvents Corporation has announced the creation of a new group to conduct market development in industrial chemicals and the reorganization of the Technical Service Division. The changes are designed to strengthen the company's sales organization and to provide more efficient service to customers, according to H. J. Henry, vice president in charge of sales.

The Market Development group has been assigned special projects relating to the development of markets for both new products and established products of the Industrial Chemicals Division.

Dr. Frank E. Dolian, formerly assistant manager of the Technical Service Division, has been appointed manager of the Market Development Group. Assigned to his staff are the following personnel, previously in the Technical Service Division: Kenneth W. Bayha, San Francisco, A. Mosher Cooke, Boston; Walter C. Gwinner, New York; and Louis L. Hallock, of the Terre Haute office.

•

H. C. Speel Heads Development Department at Wyandotte

Henry C. Speel has been recently appointed director of the development department of Wyandotte Chemicals Corporation, Wyandotte, Michigan.

Formerly with General Dyestuffs Corporation, Mr. Speel has had extensive experience in market research and market development work over the last 20 years with Atlas Powder Company, General Mills, Inc., Alrose Chemical Company and General Aniline and Film Corporation.

Whatever your Aluminum Paint problem ...there's an MD ALUMINUM PIGMENT— to meet it!

The full line of MD ALUMINUM PIGMENTS is so complete it amply meets all requirements of a wide range of standardized and specialized All-Purpose Aluminum Paint applications. Included are standard and extra fine lining pastes of every degree of brightness, lustre and gloss, providing finishes from a dull matte surface to the brightest metallic appearance.

MD 566 ALUMINUM PASTE
MD 565 W ALUMINUM PASTE
MD 565 ALUMINUM PASTE
General purpose pigment for applications where high specular gloss is required.
Standard bright pigment; high diffuse reflectivity; no glare on exterior applications.
General purpose pigment; balanced specular-diffuse reflectivity.

MD's absolute uniformity of quality provides the ultimate in Aluminum Paint formulations. Specify that MD ALUMINUM PASTE be used in the formulation of the ready-mixed Aluminum Paints you manufacture.

METALS DISINTEGRATING COMPANY, INC.

General Offices: Elizabeth B, New Jersey — **Sales Offices: Chicago, Ill., Cleveland, Ohio**

Plants: Elizabeth, N. J., Manchester, N. H., Berkeley, Calif., Emeryville, Calif.

1357 MD POWDERS Since 1916

ALUMINUM PASTES
ALUMINUM POWDERS
GOLD BRONZE POWDERS

STRETCH

your Solvent power with Ketones

Use *more* diluent at no loss of quality

Every pound of ketones you use s-t-r-e-t-c-h-e-s your ability to formulate high-quality lacquers.

Ketone solvents permit the use of greater quantities of low-cost diluents without lowering quality.

At the same time these powerful ketone solvents give you the lowest viscosity formulations when used with any practical resin-nitrocellulose combination.

Your Shell Chemical representative will gladly point out just how you can profit by the competitive advantages of Ketone formulations.

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Eastern Division: 500 Fifth Avenue, New York 18 • Western Division: 100 Bush Street, San Francisco 6
Los Angeles • Houston • St. Louis • Chicago • Cleveland • Boston • Detroit • Newark

IN CANADA: Shell Oil Company of Canada, Limited • Toronto • Montreal • Vancouver

M. J. RHOAD

M. J. Rhoad Named to Sales Staff of Goodyear

Appointment of M. J. Rhoad a chemist in fundamental research at The Goodyear Tire & Rubber Company, to the sales staff of the Chemical Division of that company has been announced here.

Mr. Rhoad, according to H. R. Thies, manager of the Chemical Division, brings to the chemical organization a broad knowledge of synthetic rubbers and resins, having served more than seven years in development of these products in the company's research laboratories.

•

Emery Promotes V. Colby

Emery Industries, Inc., is pleased to announce the promotion of Vernon W. Colby to an assistant chemical sales manager supplementing the activities of Robert T. Hull, also an assistant chemical sales manager, and Robert F. Brown, chemical sales manager.

•

ASTM Revision on Venetian Red

The revision approved by the Standards Committee applies to tentative specification for venetian red (D 767-50 T). This revision will permit a maximum of calcium carbonate of 4.0 per cent in all three types of venetian red covered by these specifications. The present maximum limit is 0.1 per cent.

Presentation of Nuodex Award at North Dakota Agricultural College

Nuodex Honors Two Students at N. Dakota Agricultural College

James Paul Talley and Richard Bruce Drubel, graduate students in the Paint Department of the School of Chemical Technology at North Dakota Agricultural College, Fargo, were named recipients of the Nuodex prizes, awarded each year by Nuodex Products Co., Inc. of Elizabeth, New Jersey.

These awards are given to paint students who have attained the highest scholastic standing in the protective coatings courses.

The presentations were made by Dr. R. E. Dunbar, Dean of the School of Chemical Technology and Dr. Wouter Bosch, Professor of Industrial Chemistry and Chairman of the Department of Paints and Varnishes. Left to right: Dr. Bosch, Drubel, Talley, Dr. Dunbar.

Tung Oil Group Meets Oct. 11

The National Convention of the American Tung Oil Association will be held Oct. 11–12 at the Buena Vista Hotel in Biloxi, Miss.

•

Case Institute Announces Paint Technology Course

The Evening Division of Case Institute of Technology have announced a course in fundamentals on "Paint as an Engineering Material." This course is known as number CH-172. Lectures will be held on Tuesday and Thursday at 6: 30–8: 00 P.M., Sept. 18, 1951 to Jan. 25, 1952. Registration will be held on Sept. 13–14, 1951, 6: 30–9: 00 P.M. For further information write to W. von Fischer or E. G. Bobalek, Case Institute of Technology, Cleveland 6, Ohio.

COLOR EFFECTS

(*From page 21*)

650 hours and after 770 hours. Here the parallel developments on both panels are clearly evident.

To show that the color changes are not caused by the outside layer of rust only, some rust was removed from one of the test panels and was placed on an aluminum base, which does not produce blue potasium ferri-ferrocyanide derivatives. The printing on this rust is shown in Figure 7A. In removing the rust and repeating the printing test, very little ionizable, blue printing matter had been freed from the inner parts of the rust specimen as shown in Figure 7B.

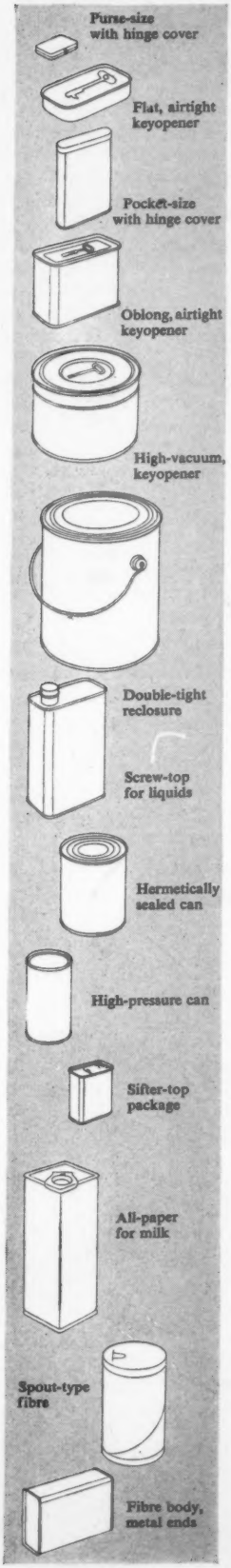
There is one final fact to be mentioned here. The idea might come up that the no-longer-ionizable rust could actually act as a protection against further corrosion. This is not found to be the case. For instance, Figure 8A shows a specimen where after 1500 hours salt-fog exposure, a considerable amount of non-ionizable rust was present in the widened cross line area, but further exposure in the salt-fog cabinet produced new areas of corrosion. Figure 8B shows continued spreading of paint failure after 1740 hours.

Further developments in the study of color effects in electrographic printing are still being observed.

References

[1] Max Kronstein, Marion Ward and Robert Roper, Industrial Engineering Chemistry, Vol. 42, 1, 5, 6, 8, Aug. 1950.
[2] W. A. Wesley and C. H. Lindsley, Pitting of Stainless Steel and the Insolubility of Ferric Ion in Sea Water, Metals and Alloys, Dec. 1937, 335–337.

WHICH PACKAGE SUITS YOUR PRODUCT?



The most important thing to know about the turpentine can!

The most important thing about this container is not that it is a handy can that pours easily, doesn't drip and closes tight. Nor that it is known as the package that "works with" the label by providing plenty of space to show your brand in brilliant color.

No, the most important thing about this container is the fact that it is just one of the *hundreds* of containers pioneered and developed by American Can Company. Packages in use today by an enormous number of different businesses.

We mention this as a means of pointing up the fact that Canco, since 1901, has come up with the solution to more packaging problems than any other organization in the industry.

And it is this experience that developed Canco's many-sided art of versatility—an art which is practiced time and again to the advantage of its customers.

Today, in these critical times, Canco's 50 years of accumulated knowledge and resourcefulness will help its customers meet the unusual problems brought about by the national emergency.

CANCO **AMERICAN CAN CO.**

NEW YORK
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G. W. REESE

Canco Appoints General Manager of Manufacture

G. W. Reese, associated with the American Can Company for 31 years, has been appointed general manager of manufacture, it was announced by W. C. Stolk, president.

Formerly assistant general manager of manufacture, Mr. Reese succeeds S. D. Arms, who recently was elected vice president in charge of the company's Atlantic division.

•

Marine Paint Use Increases

Use of marine paint has increased 150–200 percent since the Korean conflict, according to the Marine Committee sponsored by the Chemical Division, NPA. This has caused a shortage in such raw materials as titanium dioxide, aluminum powder and paste, and some phenolic and alkyd resins.

Industry spokesmen asked that marine paint manufacturers be permitted to use tin-coated cans instead of black plate, since such cans are subject to atmospheric conditions which rust black plate. The committee pointed out that bails (wire handles)—necessary to carry marine paints up and down ship ladders—cannot be welded to black plate. NPA said critical shortages of tin have forced the substitution of black plate, but agreed to refer this marine paint industry problem to the Tin Division.

The Maritime Administration told the committee it is considering a change in specifications on paints to permit use of standard marine paints on government ships.

Dress Made Mgr. of Du Pont Finishes at Fort Madison

Norman I. Dress has been appointed manager of the Fort Madison, Iowa finishes plant of the Du Pont Co.

Mr. Dress joined the Philadelphia paint laboratory in 1926. He went into production as a foreman at the Philadelphia plant in 1927, and held various supervisory posts there before going to Chicago in 1947 as assistant manager of the finishes plant there.

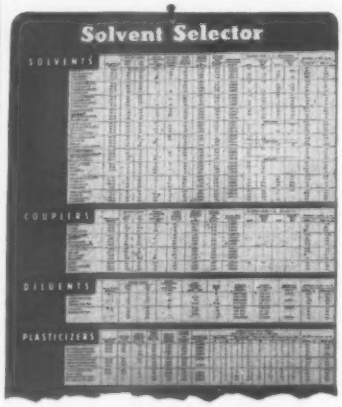
•

Naugatuck Chemical Announces Expansion

Naugatuck chemical division, United States Rubber Company, recently announced a major expansion program aimed at doubling the production of its Baton Rouge, La., Paracril synthetic rubber plant.

The expansion program will bring plant capacity for the production of Paracril nitrile rubber, Nitrex latex, high styrene latex and high styrene resins to approximately 30,000,000 pounds annually.

Paracril rubber is used in the manufacture of self-sealing fuel cells and bullet-sealing hose for military aircraft and for critically needed oil-resistant rubber products. High styrene latex is a major ingredient of water-based paints and is finding an expanding use in paper coating applications. High styrene resins in combination with Paracril are in strong demand for injection molding and extrusion operations. Nitrex is Paracril in latex form used in paper, textile and leather finishing applications.



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Have helpful data on 75 ester, ketone, and glycol-ether solvents, couplers, and plasticizers right at your fingertips. CARBIDE's Solvent Selector Chart is now available in business-letter size for convenient stay-in-your-chair reference. You can keep it in the pocket of your desk pad.

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KNOX PRICE

Knox Price Joins Nuodex

Knox Price, formerly General Manager of Atlas Paint and Varnish Company, Los Angeles, and Vice-President of the Atlas subsidiary, Seidlitz-Multitint-Atlas Paints, Inc., has joined Nuodex Products Co., Inc., manufacturers of driers, fungicides and specialty chemicals, as West Coast Sales Manager, according to H. M. Johnson, Nuodex Vice-President in Charge of Sales.

Mr. Price, whose headquarters will be in Los Angeles, will work with the four Nuodex agents on the Coast in contacting accounts in the paint, ink, textile and allied industries. The four agents are E. B. Taylor Company, Los Angeles; Cole and DeGraf, San Francisco; D. B. Smith, Seattle; and Fred E. Alsop and Co., Portland.

•

Stanley A. Thompson to Aid ADM Customers

Appointment of Stanley A. Thompson as manager of the Special Oils Technical Service Department for Archer-Daniels-Midland Company has been announced by S. O. Sorensen, vice-president in charge of research of the Minneapolis firm.

In his new capacity, Thompson will assist ADM customers in the solution of technical problems in the manufacture of paint, varnish, lacquer and other protective coatings. He will also serve in liaison work; correlating research activities for the ADM Sales Department.

First Fall Meeting of N. Y. Production Club

The first Fall meeting of the New York Paint and Varnish Production Club will be held September 6, 1951 in the Building Trades Employer's Association rooms at #2 Park Avenue, New York City. Dinner at 6:30 P.M. on the 26th floor.

The subject for the evening's talk will be "Army Ordnance Paint Specifications" and will be presented by Dr. Charles F. Pickett. Dr. Pickett is chief of the Paint and Chemical Laboratory, Ordnance Corps., Aberdeen Proving Ground, Maryland.

•

Dr. E. K. Fischer Dies Suddenly

Dr. Earl K. Fischer, formerly Chief of the Organic Coatings Section of the National Bureau of Standards died suddenly on August 3rd.

•

Davison Chemical Names D. H. Litter Distributor of Syloid

The Davison Chemical Corporation, Baltimore, has appointed D. H. Litter, Inc., manufacturers' agent for lacquer and varnish materials, of 114 E. 16th St., New York City, and Boston, distributor for Syloid 308 in the New York and New England areas, effective immediately.

Syloid 308 is Davison's flattening material, for giving a matte, or hand-rubbed finish effect, to lacquers and varnishes. The new distributor will maintain warehouse stocks of the product at both points, and technical service will be available through the D. H. Litter Laboratories, New York City.

QUALITY is important
... NOW MORE THAN EVER
Partial view of plant at Neville Island, on the Ohio River, 8 miles west of Pittsburgh, Pa., showing main resin manufacturing and solvent refining units.

Neville service to industry is characterized by a traditional policy of continuous development and expansion, and co-operative technical assistance that means much to the buyer of chemicals.

You can be sure of quality on any Neville product you use—whether a resin, oil, solvent or specialty!

THE NEVILLE COMPANY NEVILLE PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

PATENTS

Conducted by

Lancaster, Allwine & Rommel

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Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Treatment of Phthalocyanines

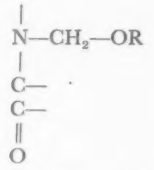
U. S. Patent 2,540,775. Robert E. Brouillard, Bound Brook, and Vito A. Giambalvo, Somerville, N. J., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

In the manufacture of improved microcrystalline phthalocyanine pigments having high resistance to flocculation from amorphous phthalocyanine pigments, the improved process which comprises admixing an aqueous dispersion of finely divided amorphous phthalocyanine pigment with a water immiscible organic liquid selected from the group consisting of hydrocarbons and halogenated hydrocarbons having boiling points between 50° C. and 250° C., agitating the mixture until the pigment is transferred from the aqueous to the non-aqueous phase of said mixture, continuing the agitation until the amorphous pigment is converted into needle-like microcrystals of less than 0.5 micron average length, removing the organic liquid from said mixture to obtain an aqueous dispersion of said microcrystalline phthalocyanine pigment, and separating the microcrystalline phthalocyanine pigment from said aqueous dispersion, the finely divided, microcrystalline phthalocyanine pigment so obtained having high resistance to flocculation.

Coating Composition Flatted With Silica Aerogel

U. S. Patent 2,541,975. Arthur Raymond Bird, Denville, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del., a corporation of Delaware.

A non-settling, non-silking, and non-flooding coating composition comprising a lower aliphatic monohydric alcohol having up to 5 C atoms modified urea formaldehyde resin, from 0.2% to 7% of a silica aerogel, and from .02% to .30% of an alcohol soluble linear polymeric film-forming polyamide having recurring



groups where R is an aliphatic radical of not more than six carbon atoms.

Moisture Setting Paint

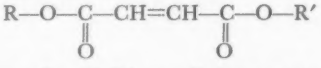
U. S. Patent 2,553,665. Albin K. Schoepf, New York, N. Y., assignor to Sun Chemical Corporation, New York, N. Y., a corporation of Delaware.

A paint material comprising coloring material and a vehicle component, said vehicle component comprising a glycol-soluble phenol-formaldehyde resin and a liquid component which is miscible with water and which is a solvent for said resin, said liquid component comprising a material selected from the group consisting of ethylene glycol and the mono-ethyl ether of ethylene glycol and mixtures thereof, said vehicle having a water tolerance of up to 48 parts by weight of water per 100 parts by weight of said vehicle, said paint having the character of rapid setting under all normal relative humidity conditions.

Coating Composition

U. S. Patent 2,544,691. Joseph H. Kugler and William E. Lundquist, St. Paul, Minn., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn., a corporation of Delaware.

A composition for use in coating porous sheet material comprising an aqueous dispersion of a copolymer of about 65–80 parts of a lower acrylate ester with correspondingly about 35–20 parts of a compound of the formula



where R and R′ are alkyl groups having at least three carbon atoms and not more than six carbon atoms.

Oxidation of Drying Oils

U. S. Patent 2,555,976. Vincent J. Keenan, Ardmore, Pa., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey.

The method which comprises contacting an oil selected from the class consisting of drying and semi-drying oils with an oxygen-containing gas in the presence of a material selected from the group consisting of ketene, diketene and mixtures thereof and thereby effecting accelerated oxidation of said oil.

Metal-Free Phthalocyanine Pigment

U. S. Patent 2,556,729. Otto Stallmann, Bridgeton, N. J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

As a new product, a pigment comprising metal-free phthalocyanine essentially in the form of beta crystals at least 90% of which are of a size not greater than 0.2 micron, said pigment being characterized by a greenish shade of blue compared to the shade of the same, phthalocyanine color in acid-pasted form, said pigment being further characterized by substantial absence of tendency to increase its crystal size, with attendant loss of tinctorial strength, when boiled for 1 hour in xylene.

Stabilizing Polystyrene Emulsions

U. S. Patent 2,545,702. Forrest H. Norris, Springfield, Mass., assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A process for preparing stable suspensions which comprises polymerizing 100 parts of styrene with substantially constant agitation in an aqueous medium comprising a water solution containing from 0.1 to 5 parts of a compound taken from the group consisting of ammonium and alkali metal salts of a copolymer of a vinyl ester of a lower aliphatic acid and maleic anhydride and from 0.1 to 5 parts of a compound taken from the group consisting of ammonium and alkali metal salts of monocarboxylic aliphatic acids containing from 12 to 20 carbon atoms.

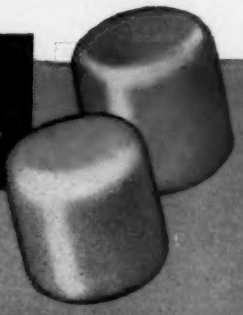
Copolymerization of Styrene With Blown Oil

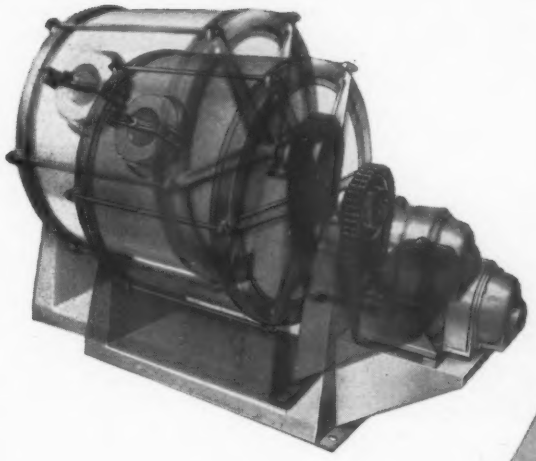
U. S. Patent 2,556,336. Roland W. Nyem, Springfield, N. J., assignor, by mesne assignments, to Harvel Research Corporation, a corporation of New Jersey.

The method comprising copolymerizing blown unsaturated fatty oil and styrene by heating a solution of a blown unsaturated fatty oil and monomeric styrene in a solvent, the ratio by weight of the monomeric styrene to the blown oil in said solution being in the range of 50–100 to 300–100, and the viscosity of said blown oil at 25° C. being in the range of 10–300 poises, then precipitating out the copolymerized blown oil-styrene product from said mass, removing said precipitate and then dissolving it in monomeric styrene.

YOU'LL SEE DOUBLE WHEN YOU USE

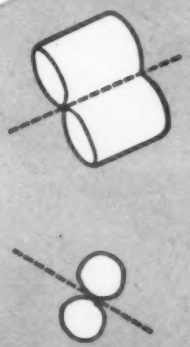
Burundum





It's a fact!! You'll see practically double the production from your mills when you use Burundum, the cylindrical grinding medium.

Many paint manufacturers are getting faster, finer grinds through the simple substitution of Burundum for other non-metallic media. One paint maker reports the grinding of a standard chrome green in an alkyd vehicle was accomplished in 23 hours with Burundum as compared to 46 hours for flint pebbles. Another slashed the grinding time of a gray enamel from 80 to 42 hours with Burundum. Still another ground a zinc chromate primer in just under half the usual time by using Burundum. You, too, can make substantial savings in time by switching to Burundum.



Burundum's tubular shape means greater grinding contact area. No matter how the media falls contact area is greater than the pinpoint contact characteristic of spherical media.

The main reasons for the greater grinding efficiency of Burundum are its unique form, high density, and high specific gravity. Combined, they give you faster action, greater attrition, less "floating" and "packing".

You'll also like the tough, impermeable surface of Burundum that makes for long, uniform wear — minimum contamination—easier, faster washing.

Why don't you get more out of your mills, by putting Burundum in?

For Samples, Case Histories, and Technical Data

U. S. STONEWARE

AKRON 9, OHIO

PROCESS EQUIPMENT DIVISION

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Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Treatment of Phthalocyanines

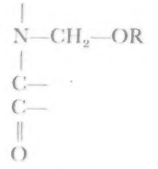
U. S. Patent 2,540,775. Robert E. Brouillard, Bound Brook, and Vito A. Giambalvo, Somerville, N. J., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

In the manufacture of improved microcrystalline phthalocyanine pigments having high resistance to flocculation from amorphous phthalocyanine pigments, the improved process which comprises admixing an aqueous dispersion of finely divided amorphous phthalocyanine pigment with a water immiscible organic liquid selected from the group consisting of hydrocarbons and halogenated hydrocarbons having boiling points between 50° C. and 250° C., agitating the mixture until the pigment is transferred from the aqueous to the non-aqueous phase of said mixture, continuing the agitation until the amorphous pigment is converted into needle-like microcrystals of less than 0.5 micron average length, removing the organic liquid from said mixture to obtain an aqueous dispersion of said microcrystalline phthalocyanine pigment, and separating the microcrystalline phthalocyanine pigment from said aqueous dispersion, the finely divided, microcrystalline phthalocyanine pigment so obtained having high resistance to flocculation.

Coating Composition Flatted With Silica Aerogel

U. S. Patent 2,541,975. Arthur Raymond Bird, Denville, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del., a corporation of Delaware.

A non-settling, non-silking, and non-flooding coating composition comprising a lower aliphatic monohydric alcohol having up to 5 C atoms modified urea formaldehyde resin, from 0.2% to 7% of a silica aerogel, and from .02% to .30% of an alcohol soluble linear polymeric film-forming polyamide having recurring



groups where R is an aliphatic radical of not more than six carbon atoms.

Moisture Setting Paint

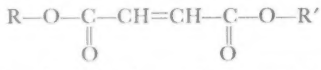
U. S. Patent 2,553,665. Albin K. Schoepf, New York, N. Y., assignor to Sun Chemical Corporation, New York, N. Y., a corporation of Delaware.

A paint material comprising coloring material and a vehicle component, said vehicle component comprising a glycol-soluble phenol-formaldehyde resin and a liquid component which is miscible with water and which is a solvent for said resin, said liquid component comprising a material selected from the group consisting of ethylene glycol and the mono-ethyl ether of ethylene glycol and mixtures thereof, said vehicle having a water tolerance of up to 48 parts by weight of water per 100 parts by weight of said vehicle, said paint having the character of rapid setting under all normal relative humidity conditions.

Coating Composition

U. S. Patent 2,544,691. Joseph H. Kugler and William E. Lundquist, St. Paul, Minn., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn., a corporation of Delaware.

A composition for use in coating porous sheet material comprising an aqueous dispersion of a copolymer of about 65–80 parts of a lower acrylate ester with correspondingly about 35–20 parts of a compound of the formula



where R and R′ are alkyl groups having at least three carbon atoms and not more than six carbon atoms.

Oxidation of Drying Oils

U. S. Patent 2,555,976. Vincent J. Keenan, Ardmore, Pa., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey.

The method which comprises contacting an oil selected from the class consisting of drying and semi-drying oils with an oxygen-containing gas in the presence of a material selected from the group consisting of ketene, diketene and mixtures thereof and thereby effecting accelerated oxidation of said oil.

Metal-Free Phthalocyanine Pigment

U. S. Patent 2,556,729. Otto Stallmann, Bridgeton, N. J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

As a new product, a pigment comprising metal-free phthalocyanine essentially in the form of beta crystals at least 90% of which are of a size not greater than 0.2 micron, said pigment being characterized by a greenish shade of blue compared to the shade of the same, phthalocyanine color in acid-pasted form, said pigment being further characterized by substantial absence of tendency to increase its crystal size, with attendant loss of tinctorial strength, when boiled for 1 hour in xylene.

Stabilizing Polystyrene Emulsions

U. S. Patent 2,545,702. Forrest H. Norris, Springfield, Mass., assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A process for preparing stable suspensions which comprises polymerizing 100 parts of styrene with substantially constant agitation in an aqueous medium comprising a water solution containing from 0.1 to 5 parts of a compound taken from the group consisting of ammonium and alkali metal salts of a copolymer of a vinyl ester of a lower aliphatic acid and maleic anhydride and from 0.1 to 5 parts of a compound taken from the group consisting of ammonium and alkali metal salts of monocarboxylic aliphatic acids containing from 12 to 20 carbon atoms.

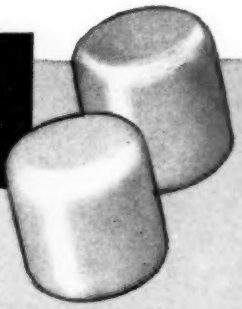
Copolymerization of Styrene With Blown Oil

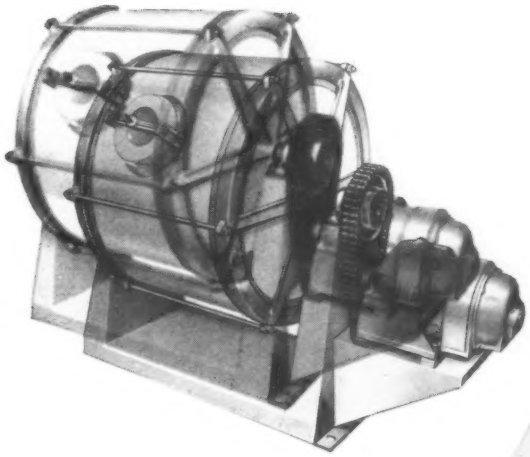
U. S. Patent 2,556,336. Roland W. Nyem, Springfield, N. J., assignor, by mesne assignments, to Harvel Research Corporation, a corporation of New Jersey.

The method comprising copolymerizing blown unsaturated fatty oil and styrene by heating a solution of a blown unsaturated fatty oil and monomeric styrene in a solvent, the ratio by weight of the monomeric styrene to the blown oil in said solution being in the range of 50–100 to 300–100, and the viscosity of said blown oil at 25° C. being in the range of 10–300 poises, then precipitating out the copolymerized blown oil-styrene product from said mass, removing said precipitate and then dissolving it in monomeric styrene.

YOU'LL SEE DOUBLE WHEN YOU USE

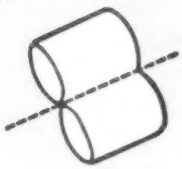
Burundum





It's a fact!! You'll see practically double the production from your mills when you use Burundum, the cylindrical grinding medium.

Many paint manufacturers are getting faster, finer grinds through the simple substitution of Burundum for other non-metallic media. One paint maker reports the grinding of a standard chrome green in an alkyd vehicle was accomplished in 23 hours with Burundum as compared to 46 hours for flint pebbles. Another slashed the grinding time of a gray enamel from 80 to 42 hours with Burundum. Still another ground a zinc chromate primer in just under half the usual time by using Burundum. You, too, can make substantial savings in time by switching to Burundum.

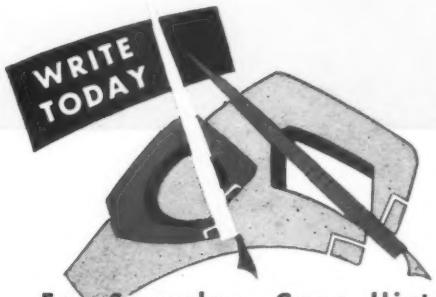


Burundum's tubular shape means greater grinding contact area. No matter how the media falls contact area is greater than the pinpoint contact characteristic of spherical media.

The main reasons for the greater grinding efficiency of Burundum are its unique form, high density, and high specific gravity. Combined, they give you faster action, greater attrition, less "floating" and "packing".

You'll also like the tough, impermeable surface of Burundum that makes for long, uniform wear — minimum contamination—easier, faster washing.

Why don't you get more out of your mills, by putting Burundum in?



For Samples, Case Histories, and Technical Data

U. S. STONEWARE

AKRON 9, OHIO

PROCESS EQUIPMENT DIVISION

183C

Production of Adipic Acid

U. S. Patent 2,551,675. John C. Hillyer and James T. Edmonds, Bartlesville, Okla., assignors to Phillips Petroleum Company, a corporation of Delaware.

A process for the manufacture of adipic acid from butadiene, water and furfural comprising, introducing butadiene, water, and furfural into a reaction zone to provide a resulting admixture containing from 3–50 percent butadiene, and from 1–30 percent water based on the weight of furfural, maintaining the resulting admixture at a temperature within the limits of 160 and 325° F., for a period of from 5–125 hours, recovering a product fraction from the resulting reaction mixture containing a lactone having a composition in accordance with the empirical formula $C_9H_{12}O_3$, dissolving a lactone-containing fraction thus recovered in an inert solvent and contacting the resulting solution with hydrogen under a pressure to maintain said solution in liquid phase, in the presence of a hydrogenation catalyst at a temperature within the limits of 60–300 F. whereby hydrogenation takes place; removing said solvent and said catalyst from the resulting hydrogenation reaction mixture, whereby residual hydrogenation product is obtained; admixing residual hydrogenation product with an oxidizing agent and maintaining the resulting admixture at a temperature within the limits of 100–200 F., whereby said residual product is oxidized to form adipic acid; and recovering adipic acid as a product of the process.

Coating Composition

U. S. Patent 2,536,049. William F. Flanagan, Dayton, Ohio, assignor to New Wrinkle, Inc., Dayton, Ohio, a corporation of Delaware.

A coating composition comprising 150 parts by weight of a vinyl chloride-vinyl acetate copolymer, 100 parts by weight of butyl acetate, 100 parts by weight of methyl ethyl ketone, and 125 parts by weight of cyclohexanone.

Carnauba Wax Substitute

U. S. Patent 2,546,328. Karekin G. Arabian, El Cerrito, and August A. Schaerer, Berkeley, Calif., assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

A carnauba wax composition substitute consisting essentially of 30–70 per cent each of a mineral oil of lubricating oil viscosity and of a mixture of straight-chain microcrystalline hydrocarbon waxes, the molecular weights of which are from 550 to 900, the major portion of which have molecular weights from 600 to 750.

Manufacture of Ultramarine

U. S. Patent 2,544,693. Charles A. Kumins, Tuckahoe, N. Y., assignor to Interchemical Corporation, New York, N. Y., a corporation of Ohio.

The method of producing ultramarine which comprises heating a mixture in proportions sufficient to produce an ultramarine blue, of sulfur, an alkali metal salt of an aliphatic carboxy acid and an alumino-silicate with the exclusion of air at a temperature of the order of 750° to 900° C. for twenty minutes to three hours, changing the ambient atmosphere to oxidizing conditions and continuing the heating under oxidizing conditions at a temperature of the order of 450° to 900° C. for one-half to three hours and cooling, washing and grinding the resultant product.

Manufacture of Polystyrene

U. S. Patent 2,556,488. Leslie Ernest Wakeford and Donald Helmsley Hewitt, London, England; Ernest Booth and Richard Hartlebury Buckle, executors of said Donald Helmsley Hewitt, deceased, assignors, by mesne assignments, to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio.

A process for the production of polystyrene of a relatively low molecular weight in the order of 9,000 to 12,000 which consists in effecting the polymerization by heating, in the absence of a polymerization catalyst, monomeric styrene in a solvent containing at least one terpene of the class consisting of monocyclic and dicyclic alpha terpenes in an amount sufficient to control the molecular weight of the product.

WHY YOU SHOULD DEVOTE MORE LAB TIME TO MILDEW RESISTANT FINISHES

If you make trade sales finishes, probably every one of the 50,000 contracting painters who read National Painters Magazine is your company's customer or prospect. That's why stories in the magazine related to products you make or can make frequently deserve your careful review.

Such an article ran in the June issue. Called "It Isn't Dirt—It's Mildew", it undoubtedly received considerable attention from painters all over the country because it told them how to do a better job for their clients. As they read, they learned facts about mildew on painted surfaces and what to do about it that you, too, should understand completely—facts that can mean more sales and more profits for your company.

They learned that mildew as a cause of exterior paint discoloration is far more prevalent than anyone believes; that mildew not only discolors the paint film but weakens it as well; that it can be effectively controlled by formulations employing a scientific balance of proper pigments and vehicles combined with patented cresol mercury naphthenate—AD-IT.

The complete article gives you all the details. You ought to read it. It will show you why you should be devoting serious laboratory time to the development of mildew resistant finishes—or broadening your line if you already make them. We'll be happy to send you a reprint of "It Isn't Dirt—It's Mildew". Write for it today!

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TECHNICAL Bulletins

RAW MATERIALS CHART

Revised handy reference chart listing the many products of Advance Solvents & Chemical Corp., 245 Fifth Ave., New York 16, N. Y., for the protective coatings industry is available.

Listing the various types of driers, stabilizers, plasticizers, paint specialties, tackifiers, wood preservatives and emulsifiers available, the chart is designed for quick reference by chemists, production men and others.

COPPER NAPHTHENATE

The Witco Chemical Company has issued a Technical Service Report on Witco 8% Copper Naphthenate, a fungicide and preservative for cellulose materials.

Water-insoluble, the Witco 8% Copper Naphthenate is soluble in petroleum and oil solvents. It is generally non-toxic, an advantage over some other compounds for the purpose. Skin contact is generally non-injurious. Application is by dipping, brushing or spraying.

Common uses of Witco 8% Copper Naphthenate are: Protecting fish nets, cordage, baling and binder twine, burlap, sand bags, telephone poles, etc. It is also an important constituent of fungicidal and anti-fouling paints.

Copy of the report may be obtained by writing for Technical Service Report P-15, "Witco 8% Copper Naphthenate," to Witco Chemical Company, 295 Madison Avenue, New York 17, New York.

PLATY PIGMENTS

The Effect of Platy Pigment Extenders on the Moisture Resistance of Paint Films, Test Series III, is the last in a group of three reports concerned with studies to determine the effect of varying quantities of a platy material, wet ground mica, on the moisture resistance of paint films. Included in the report are formulations used in the experiment, results of salt-fog tests, and electrographic prints of various salt-fog exposures.

Waterground and Micro MICA for OUTSIDE HOUSE PAINTS

The life of an exterior housepaint is increased by using 10% of mica. It is good insurance. Prevents checking and cracking and provides a "self-cleaning" paint.

THE ENGLISH MICA CO.
STERLING BUILDING, STAMFORD, CONN.

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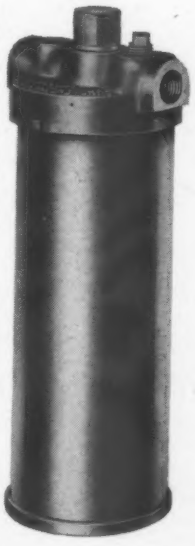
*of high-grade enamels and other pigmented products



- **SMOOTH FINISH GUARANTEED** Cuno MICRO-KLEAN guarantees the removal, mechanically, of *all* oversize pigments and contaminants.
- **FITS THE GRIND** A variety of controlled cartridge densities gives the right degree of filtration to suit each grind.
- **DOUBLE CAPACITY** Exclusive "graded density in depth" prevents premature plugging, assures uninterrupted running of each batch.
- **EASY CLEANING** Compact housing is easily disassembled and cleaned out at cartridge-replacement time.
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FOR PAINTS
Use Cuno AUTO-KLEAN strainer, all-metal, continuously cleanable. Guaranteed to remove all particles larger than specified. Available spacings from .0035 in. up.

Models available for all size batches, including laboratory and odd-lot work. MICRO-KLEAN has also been successful in filtering clear vehicles.

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Please send literature on MICRO-KLEAN for.....
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THE COMPLETE LINE
Fluid Conditioning
Removes More Sizes of Solids from More Types of Fluids
MICRONIC (Micro-Klean) • DISC-TYPE (Auto-Klean)
WIRE-WOUND (Flo-Klean)

FISH OILS

Thirty-one fish oils and vehicles are described in Archer-Daniels-Midland Company's recently revised Technical Bulletin No. 83.

Specifications and recommended uses are given for the entire ADM line of fish oils. Copolymers, non-drying, and miscellaneous oils are included as well as refrigerated, blown, and heat polymerized fish oils.

Flat paints, alkyd resins, rustproofing compounds, wood preservatives, varnish, enamels, linoleum, oilcloth, printing inks, and caulking compounds are some of the products for which fish oils are successfully used.

Copies of Technical Bulletin No. 83 on Fish Oils may be obtained by writing to Archer-Daniels-Midland Company, Box 839, Minneapolis 2, Minnesota.

SPEC FORMULATIONS

Twenty-two suggested formulas to meet twelve Federal Specifications have been developed and assembled by Archer-Daniels-Midland in Technical Bulletin No. 93.

Designed as a new service for paint and varnish manufacturers, this new bulletin offers suggested formulations to help the manufacturer meet government specifications reducing development work to a minimum. Archer-Daniels-Midland Co., Box 839, Minneapolis 2, Minn.

CARBON BLACK CHART

Godfrey L. Cabot, Inc., of Boston, Mass., has published a chart made of plastic film which lists its complete line of carbon blacks for the rubber, ink, paper, paint and plastics industries. The chart is complete with a legend showing Cabot's trade names and the corresponding chemical names of the various types of furnace and channel black made by the company.

RUBBER POLYMERS

Seventeen-page report describes test procedures and the effect of varying polymerization conditions on the properties of experimental synthetic rubber polymers. PB Report 102184 is available from the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C. Remit $2 for microfilm or $3.75 for photostat.

PUMPS

Data sheet presents design, construction, dimension drawings, and performance data on three inch-stroke, direct flow pumps for chemical handling and oil service. Aldrich Pump Co., Allentown, Pa.

WAXES

Complete and up-to-date procedures, products, and formulation for manufacture of wax polishes are included in this catalog. Performance testing of wax emulsions, additive solutions for wax emulsions, emulsion manufacturing equipment, and freezing tests. Cornelius Products Co., 386 Fourth Ave., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

Chemist: desires administrative position in laboratory or plant, or combination. Would also be interested in technical sales, or industrial application work. Wide experience with all types of pigments, oleoresinous combinations, lacquers, adhesives of all types, oil paints, paper coatings, emulsions and emulsion paints, dry powder paints and physical measurements. Box 115, *Paint and Varnish Production.*

How to

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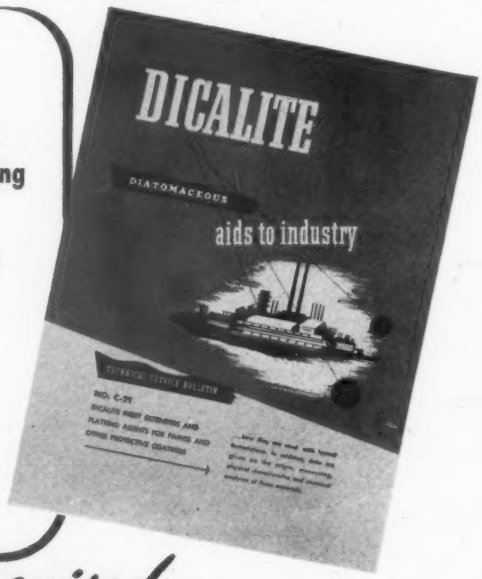
...extend your supply of titanium pigments.

...maintain high production and quality and save money.



covered in the *revised*

DICALITE* Technical Service Bulletin C-21

on inert extenders and flatting agents

This revised Bulletin C-21 summarizes results of 5-year exposure tests of outside house paints using Dicalite inert extenders. Complete physical and chemical data are listed on all Dicalite materials. Typical formulations are given for inside and outside house paints, flat varnishes, traffic paints, etc. The bulletin explains how Dicalite increases the hiding power of prime pigments—produces given hiding power with less prime pigment and without harm to color—also strengthens the film, improves brushing, leveling and washability.

SEND FOR YOUR COPY OF BULLETIN C-21—NO CHARGE

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DICALITE DIVISION, GREAT LAKES CARBON CORPORATION

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abstracts

Synthetic Rubber Latices

Thies, H. R. Presented at the Los Angeles Paint, Varnish Production Club on Nov. 8, 1950.

Recognized as one of the top rubber scientists in the industry, Thies, gave assurance that Chemigum latex paints will claim a permanent position in the interior decorating field.

In addition, he said, man-made rubber latices hold promise for exterior coatings as well.

"Although present rubber restrictions make its immediate and general use uncertain," Thies asserted, "tests and evaluations will be continued for future consideration."

From tests already conducted and those in progress in Goodyear laboratories at Akron, Thies continued, latex paints will be of extreme interest both to the consumer and to the manufacturer.

He explained that this new type of paint, which has most of the advantages of oil paints, also has the desirable characteristic of water emulsions, that of using water in place of the usual organic solvents.

Use of water, he added, thus eliminates the sometimes toxic odor of paint which long has been an objectionable problem of the industry. Quick drying characteristic of latex paint, and its superior scrub resistance too, should have a strong appeal to the consumer.

The manufacturer, in turn, he said, will be aided through reduced storage and inventory problems, as well as fire and toxicity hazards by elimination of solvents, mostly of an unstable nature.

Thies also discussed briefly the use of Pliolite resins and latices (butadiene-styrene) in paint formulations.

Pigment Dispersion

Hoback, Waller H. Presented at the New York Paint and Varnish Production Club Meeting on January 4, 1951.

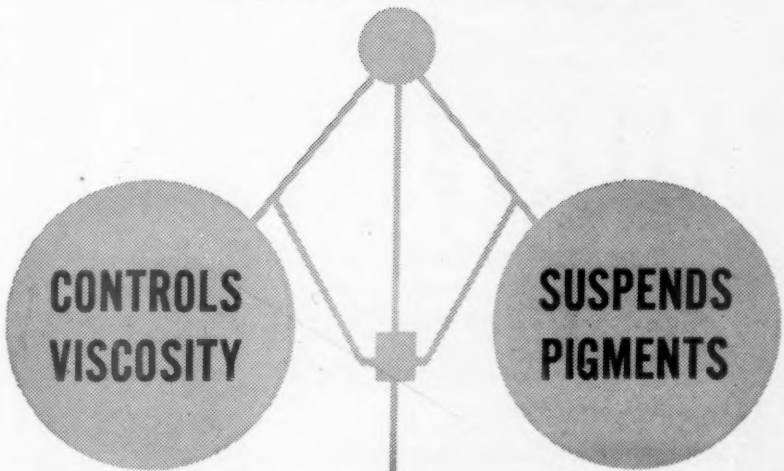
Mr. Hoback's talk was illustrated with slides, some in color, to show the results of the work done on this problem. While most of the facts brought out by Mr. Hoback are well known in the paint industry, the clarity and conciseness of his presentation was excellent and served to refresh the subject in the minds of those listening.

In general, the lecture was on the concepts and principles relating to the dispersion of pigments. Although the greater part of the work was done using titanium dioxides, of various types, and a short oil baking alkyd, enough work was done to indicate that the same principles hold true for other combinations.

A preliminary discussion was made of vehicle types in terms of their viscosity, structure and tack and their relationship to the problem of converting pigment from its dispersion in air phase to the dispersion in liquid binder phase. It was also shown that in a shearing type of operation, such as roller mill, a high order of strength in the vehicle is required coupled with the highest pigment concentration acceptable to the strength of the equipment used. In contrast, the pebble mill requires a system based on optimum mobility with the vehicle strength reduced either by choice of vehicle type or by dilution with solvent.

A better and quicker job of mixing can be done, according to Mr. Hoback, if the paste is mixed very heavy at the start and subsequently reduced just before it is to go on the roller mill.

Sure Stabilizer For Resin Emulsions



The proper stabilizer goes a long way in formulating the kind of resin emulsion paints householders look for today. Cellulose gum (Hercules Purified CMC) has proved itself in many leading brands. It makes viscosity-control easy and sure . . . provides lasting pigment-suspension, both during storage and after the paint has been thinned for application.

If you have not experienced the product improvements and production economies of cellulose gum in your resin-emulsion finishes, write to Hercules today for technical information and testing sample.

HERCULES POWDER COMPANY
INCORPORATED
Cellulose Products Dept.
926 Market St., Wilmington, Del.

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CELLULOSE GUM
(HERCULES® CMC)

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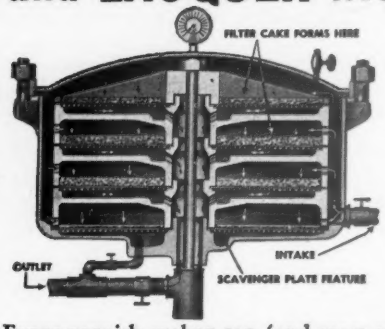

Every varnish maker can (and most of them do) use a Sparkler Filter to improve the clarity and brilliance of varnishes, lacquers and other clear liquids by removing "fish-eyes," skins, and other incidental solids and semi-solids.

We invite correspondence on any special problem related to either of the above processes. Our engineers are ready to give you the benefit of years of experience in this field.

Model 18-S-12 Varnish Filter in mildsteel (steam jacketed)

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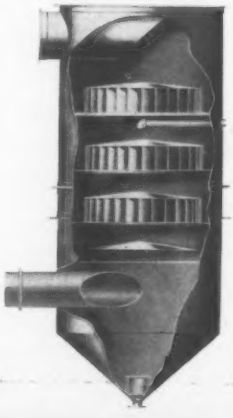
2. Salvage some valuable by-products.
3. Keep absenteeism and sick-leave down.
4. Increase productivity of employees.
5. Promote better labor relations.
6. Foster a good neighbor feeling.
7. Reduce machinery maintenance and replacement costs.



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CALENDAR OF EVENTS

Sept. 4–7. ACS, Div. of Paint, Varnish, and Plastics Chemistry, Hotel Biltmore, New York City.
Sept. 6–8. American Soybean Association, Fort Des Moines Hotel, Des Moines, Iowa.
Oct. 22–24. Thirteenth Annual Forum of the Packaging Institute, Hotel Commodore, New York City, N. Y.
Oct. 23. Association of Consulting Chemists and Chemical Engineers, Hotel Shelburne, New York City.
Oct. 29–31. National Paint, Varnish and Lacquer Association Convention, Chalfonte-Haddon Hall, Atlantic City, N. J.
Nov. 1–3. Federation of Paint and Varnish Production Clubs, Chalfonte-Haddon Hall, Atlantic City, N. J. Paint Industries Show, Oct. 31–Nov. 3.
Nov. 26–Dec. 1. Chemical Industries Exposition, Grand Central Palace, New York City.

Production Club Meetings

Baltimore, 2nd Friday, Belvedere Hotel.
Chicago, 1st Monday, Furniture Mart.
C. D. I. C., 2nd Monday.
Cincinnati—Oct., Dec., Mar., May, Cincinnati Club;
Dayton—Nov., Feb., April, Van Cleve Hotel;
Indianapolis — Sept., Claypool Hotel;
Columbus — Jan., June, Fort Hayes Hotel.
Cleveland, 3rd Friday, Hotel Auditorium.
Dallas, 2nd Thursday, No Fixed Place.
Detroit, 4th Tuesday, Rackham Building.
Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.
Houston, 2nd Tuesday, Seven Seas Restaurant.
Kansas City, 2nd Thursday, Pickwick Hotel.
Los Angeles, 2nd Wednesday, Scully's Cafe.
Louisville, 3rd Wednesday, Seelbach Hotel.
Montreal, 1st Wednesday, Queen's Hotel.
New England, 3rd Thursday, Puritan Hotel, Boston.
New York, 1st Thursday, Building Trades Employers Assn.
Northwestern, 1st Friday, St. Paul Town and Country Club.
Pacific Northwest, Annual Meetings Only.
Philadelphia, 3rd Wednesday, Engineers' Club.
Pittsburgh, 1st Monday, Fort Pitt Hotel.
St. Louis, 2nd Tuesday, Forest Park Hotel.
Southern, Annual Meetings Only.
Toronto, 3rd Monday, Diana Sweets, Ltd.
Western New York, 1st Monday, 40-8 Club, Buffalo.

Properties and Application Of Asphaltic Bitumen

The Properties of Asphaltic Bitumen With Reference To Its Technical Applications—Edited by J. Ph. Pfeiffer. Published by Elsevier Publishing Co., Inc., 250 Fifth Ave., New York, N. Y. Price $6.00.

Hardly any other aspect in the chemistry of paint and varnish has been more neglected than the study and chemical characteristics of petroleum asphalts. Most handbooks devote little space to these materials. Furthermore, specialized books in the field of asphalt technology cover in detail the testing and application of asphalt products while giving little attention to their chemical characteristics.

For a number of years, the Dutch Shell Research Laboratories in Amsterdam have been doing pioneer work in the field of asphalt research. J. Ph. Pfeiffer has been in charge of this development and from time to time he and his coworkers, Dr. R. N. J. Saal and H. Eilers, have visited this country studying American asphalt technology. However, all work concerning Shell's asphalt research is presented in this book for the first time.

It is regrettable that J. Ph. Pfeiffer, chief editor, died before the work was completed, but his coworkers have done an excellent job in completing the presentation. The book consists of both theoretical and practical sections. It covers the physical and chemical aspects by J. W. A. Labout and R. N. J. Saal as well as production problems and routine investigation methods by M. C. Siegmann. The application of asphalts together with a discussion of their solutions and emulsions by H. Eilers are also included. Finally, a discussion of asphalts in the light of their technical application by H. W. Slotboom is presented.

Although the sections have been written by different authors, the work represents a combined and joint effort by one group interested in the same subject.

Paint Film Defects

By Manfred Hess, Published by the Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Price $12.00.

This book is designed to serve the needs of the paint manufacturer in helping him to solve some of the many problems which arise in the successful use of his products. It includes a listing of the many forms of paint failures with excellent illustration of 87 of them. One hundred and twenty-four various types of failures are presented and discussed. Cross references are also provided in order that all factors connected with the particular failure in question may be brought to the attention of the reader. To assist the reader in locating the references, about 90 pages of index and bibliography are included.

This work is a new and revised form of an earlier book written by the same author in 1938 and published in Germany. The author since then has lived in England and thus includes considerable information on English practices. However, the author does not include the important work of the vinyls, especially wash primers, which have gained considerable importance in America.

The approach to a "case history" listing of paint defects is certainly well presented and interesting. This can be very helpful to the paint manufacturer as well as the technical service men who are confronted with similar failures in the field.

Both books were reviewed by Dr. Max Kronstein of the New York University.

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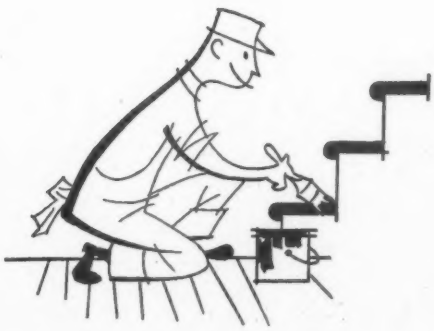

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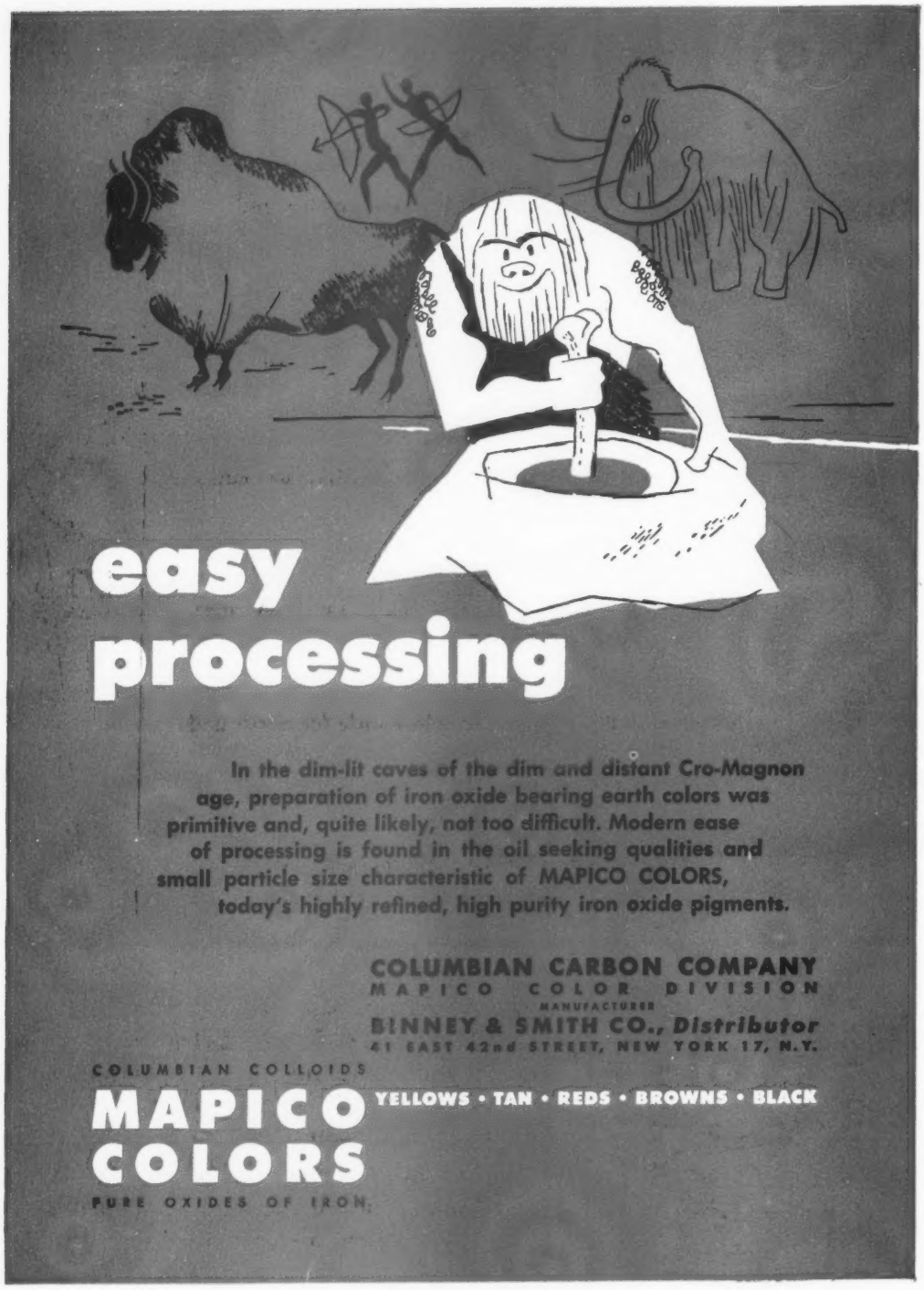
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